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DECEMBER 1971
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AMERICAN aircraft modeler



Least Expensive RC? — page 26

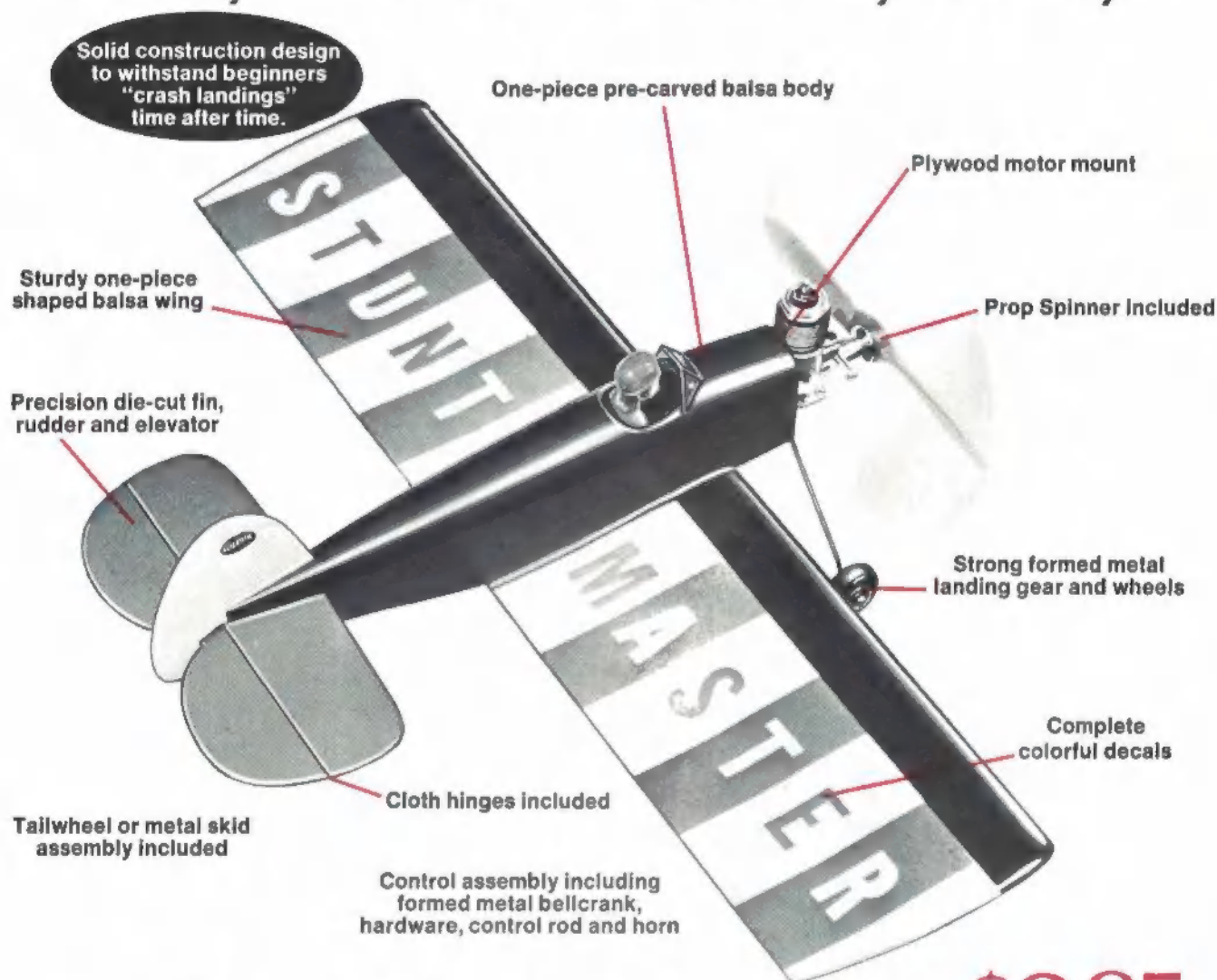
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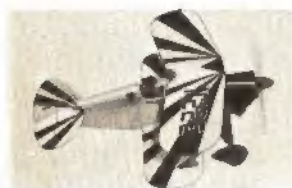
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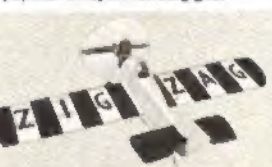
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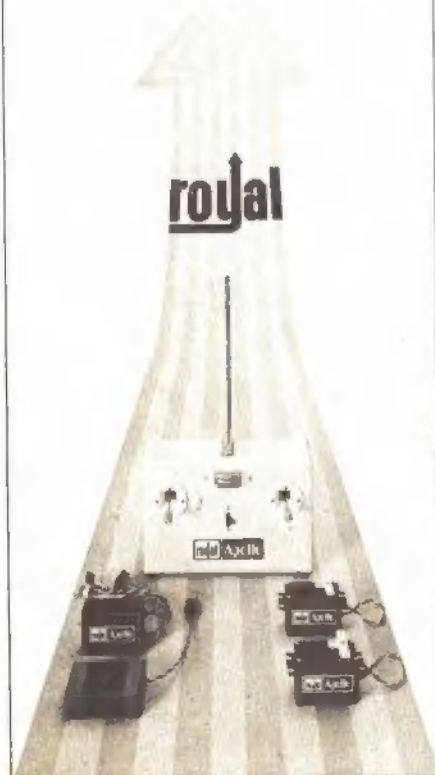
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COVER PHOTO: During photo session for a Sunday Star (Washington, D.C.) newspaper article, Harold Flecknoe photographed this array of DC/RC Club members' planes at the Club's Fairchild-Hiller flying site.

WILLIAM J. WINTER — PUBLISHER EDWARD C. SWEENEY, JR.—EDITOR
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WHAT EVER HAPPENED
TO THE SUN SHINING
THROUGH THE WINGS?

Once a person has built models long enough he finds that among the many that have come and gone there are some that stand out in memory. This especially holds true for the guy who has flown actively for tens of years. The chap who just recently put his ready-to-fly pattern job into the air will make comparisons as soon as he flies his second model.

Maybe a guy was just lucky with some models. Or maybe the aircraft merely survived some mental-block piloting techniques, wild out-of-phase stick pushing, or a seismographic contact with the olde sod. Everything that goes up does not always come down on two or three wheels, and the pilot—like the golfer who broke 100 the wrong way and dreams of the time he shot 77—fondly recalls that friendly bird of last spring or summer. It made him feel good.

When, so to speak, he has logged his 10,000 hours, things run together. There are crates long out of mind which suddenly flash back like the recollection of falling down the cellar stairs at age four. Or like a gaily-colored balloon drifting high into the sky while trailing its string. These things are recalled generally when the guys get to story telling. All these bygone birds had such phenomenal attributes! Or they did strange things, surviving incredible adventures. You always remember because, as you fly, you are alone with that speck in the sky, whether it be a Kwik-Fly, a Nobler, an old-timer Zipper, or a thermal-circling balsa glider.

Little things trigger sudden memories. The first dip of a wing tip that tells of the looming thermal. The hole in the sky called a down-draft—and that always happens in competition when you've got the meet sewn up! A glint of sunshine on a distant wing or a patch of metal foil meant to catch the timer's eye. A curious bird. That absolutely perfect touch-and-go. The emotional impact of a perfectly executed wingover against a bright blue sky. Enough of that and a fella gets restless. He may have the ultimate now. An opaque, glistening machine which he can control, just as a master aerobatic pilot knife-edging a 'Lil Stinker. But he still thirsts for something more. The world-wide interest in gliders is sufficient proof of that.

Every modeler has his thing. We've memories of a chap block running two homemade twins in a simulated setup for a Fairchild Packet he'd hopefully enter in Nats competition. An indoor man in his college dorm patiently sanding a prop—where a chuckle would bring disaster. Or sanding and rubbing a Neptune in exact scale right down to its grain-of-wheat lights. The sound of those twins roaring in perfect sync, going from low to high and throwing back the oily smoke. The glistening perfection of that Neptune in the hot late July sun as crowds watched in hypnotic silence. Those are memories to those guys.

An under-compressed Diesel zinging puffs

of white smoke high in the air on a chill November morn. A Live Wire just a speck half a mile away as its humming Mills sounded sweetly through that sound-carrying still winter air. A silk-covered original, directly overhead on a hot summer's morning, the sun shining through its wings. A crow following a duration model in never-ending circles for an hour on a cloudy, windy late afternoon, sniffing the Diesel fumes. The swift stoop of an infuriated hawk. Crowds of erratically swooping swallows following a sport model like Pups after London-bound Gothas. Models mistaken for real planes force-landing to shake up the spectators. Mistaken for border dope runners. Or overhead airline pilots mis-identifying crazy pilots stunting over a crowd.

Models in trees. On roofs. Flying across the full moon like a witch on a broom. Lost models returned after 12 or 16 years. Shot at by farmers. Impacted in a bale of hay ejected from a reaper. Losing engines and battery packs in flight. Powering across a field after hand launching with a doorbell booster swinging underneath! The guy with the first reed set tuning and tuning with earphones on his head—when an auto horn blew loudly nearby. The first five-reedbank job with tin plate reeds (a self-welding machine) but, in his timidity, all five were connected to the rudder! Well, that's the way it goes, one thought triggering another. And now with Lord knows how many thousands of readers thinking their own thoughts.

For some, modern modeling is a diversion—weekend relaxation. What is there to talk about? For others it is a necessary creative outlet, a means of expression. For many, it is both. We have reached what temporarily passes for perfection. Thanks to marvelous modern radio systems you are in the cockpit of a hurtling craft as solid and as inflexible as any metal jet. You can't look out the window to see if the wings flex, but you can mount a camera to find out—if you are that far gone.

Solid? Fast and precise. Like being on a busy military air base. Maybe it is the exaggerated scale speed that bothers us. SE-5's fly like Thompson racers. Hence all those gliders? Maybe it is whimsy, but the writer knows what he'd like to design—if he knew how. It would float on the tiniest puff of air. The sun would shine through the wings. The birds would chase it. It would fly in the parlor, the parking lot or on open prairies. It would wing-over and sit in pristine glory in a display cabinet. It would vanish out of sight but always be easy to find. It would rise off the water like a smoothly skipping stone. It would be a soaring glider but have four props like that overgrown model, the Lockheed Constellation. It would be a Luton parasol, a Smith Miniplane, a Folkerts racer, or, wild man, a wonderful Gee Bee that could fly stably like a dream ship.

You there, don't come closer. Why are you all wearing white coats?

—Bill Winter.

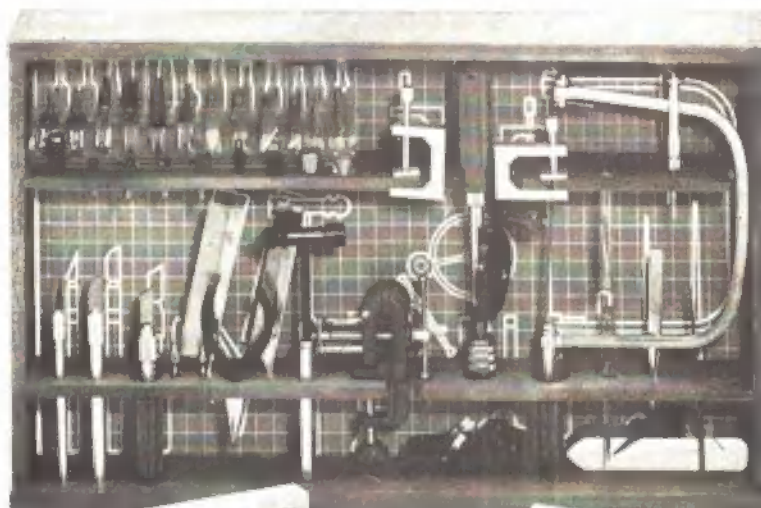
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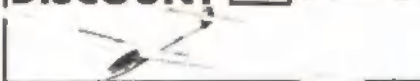
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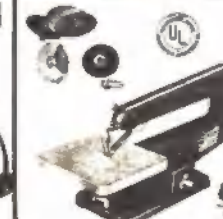


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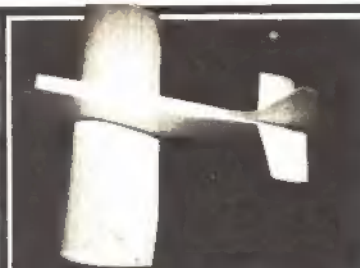
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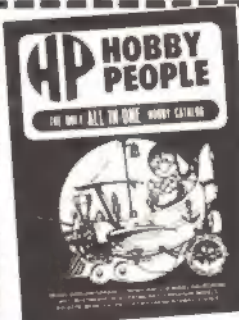
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Unusual light weight (2 to
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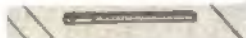
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Colors: White,
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blue, orange.



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2" - \$1.00
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You can install the
amplifier, motor, and
pot element from a
Kraft KPS-12 or Orbit

PS-40 Servo into this servo case and gear
train. Also of interest to radio scratch
builders. Gear train is fully assembled and
will operate with cover off.

NEW - KDH DRAG CHUTE **#2 for Glider hi-start \$8.95**

This is almost a duplicate of
the higher priced (\$13.95)
chute that we've advertised
before, but the \$8.95 price
makes this #2 chute more
appealing.



PENFORD "AUTO- **START" ENGINE** **STARTERS**

Starter without battery
\$21.97
Starter with battery
\$36.97



modeler mail

Needs Boeing plan

I have been modeling for over 20 years, and during this time have read and collected most issues of your magazine. I must compliment you on a great publication.

The model industry has come a long way since I started with old Strombecker solids and Comet printed wood kits. All of the current plastics and fiberglass kits are good and the equipment is fantastic, as are some of the prices. However, I still like to build my own from sheet and strip balsa and a set of plans.

I would like to know if one of your readers can help me locate an old magazine. It would probably be an *Air Trails* from around 1949. The book will have full-size foldout plans for a Boeing L-15 liaison aircraft in it. This odd-looking bird was tested by the Army in 1949 and I can remember seeing plans for it in a model book about that time. I am interested in building a model of the ship and would be very grateful if someone could help me locate the magazine.

Charles Eaton, 8008 Fort Hunt Rd.,
Alexandria, Va. 22308

Morton saga

I noticed in the June issue of AAM a letter in "Modeler Mail" from Phil Ellis requesting information concerning the Morton M-5 model engine. For the past 18 months I have been involved in a serious research of the entire Morton model engine effort, including a questionnaire which is in the process of being distributed to about 1200 persons with Old-Timer or model engine-collecting interests. I have been in contact with practically every former Morton Aircraft Corp. employee who participated in M-5 production. Only Jim Whitlatch, who test-ran the M-5 engines before shipment, remains to be located.

I am presently working with the Burgess portion of the M-5 story and hope, before too long, that I will have researched this era of the story also. The last company to produce and service the M-5 was the M & S Engineering Co., Libertyville, Ill., but they ceased working with it about 1954. The former owners of this company have furnished me with a great deal of interesting data concerning their production and much original material, including photographs, some connected with the initial Morton era in Omaha.

I have been able to rescue and assemble considerable material, even original artwork used in the preparation of the early Morton ads in *Air Trails*, company brochures, etc. To assist in my research, I am attempting to locate and acquire specimens of Glen Morton's single-cylinder engines such as the early Challengers, Imp Intermote and Water Nymph, produced in the 1930's, and also the smallest engine that had been in actual production up till that time—known as the New Hurricane 066 in 1938. My plan is to write a series of articles for our model engine-collecting fraternity, covering the various phases of the Morton story from the early single-cylinder Morton Challengers of the 1930's through the various attempts to

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This is an unheard of low price for this famous, complete 4 channel system. We have a limited number of these available at this low price, so please write or call immediately. This outfit is really deluxe and includes rechargeable nickel cadmium batteries in the transmitter and airborne system, 4 servos, charger, full warranty.
Price in effect until Dec. 30, 1971 as quantities permit.

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CARD

TRY US OUT: R. R. Did! "After a great deal of 'shopping' in Europe for radio equipment, I have come to the conclusion that your firm has the best values to offer — even considering the 50% duty imposed by France."

R. R., Couron d' Auvergne, France.

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produce and market the M-5.

With the help of Larry Hoffman, I am tracing various Japanese model magazines for possible leads on M-5 type engine production, rumored to have taken place after World War II in that country.

The only information of general interest concerning the M-5 was published in *Air Trails Pictorial* in Sept., 1947. I have had numerous requests similar to Mr. Ellis's and am reproducing one of the original Morton brochures for distribution to those who are kind enough to return my survey questionnaire. I would also like to reproduce the *Air Trails* article featuring the M-5 cutaway drawing for those seeking this data.

I recently acquired the remaining M & S parts residuals and will be making some of these parts available to M-5 owners who need them. There are many interesting angles to the Morton story—the M-5 is only one. I am afraid that I am not set up to answer a big flood of mail at present, as there is still so much to do on the research that I suspect it may be a year before it is squared away. However, this info may enlighten interested readers somewhat as to the present status of the M-5.

R.O. Knutson, Box 243,
Austin, Minn. 55912

Model wife

As the wife of a model builder and flier, I've had all the gripes and complaints a wife could have. Then one day I woke up and realized what a great hobby modeling is, and that I actually liked airplanes almost as much as my husband. So much, in fact, that I soon hope to have my own radio set.

I don't understand those wives who are so busy complaining about their husbands' hobbies. If only they would stop complaining and begin getting interested, asking questions, and offering suggestions (on the trim and colors, perhaps). Even though you may be playing second fiddle to whatever model he happens to be working on at the time, encourage him. Let him know that you are proud of him—and his models.

Sylvia Hall, Kinston, N.C.

International exchange

I am looking for someone interested in exchanging plastic airplane kits (stamps, too) available in my country for airplane kits produced by Revell, Hawk, Aurora, Monogram, Lindbergh, etc. in the United States. My collection at present includes over 150 different models.

Joseph Helpe, P.O. Box 200,
Poznan 1, Poland

Stone Age propulsion

I would like to commend you for the Wallace Kulczyk article (Feb. 1971 AAM) on designing a ducted fan. This is exactly the sort of thing that could stand some attention, since a large percentage of desired scale designs are jets. Yet, after 25 years of existence, model jet propulsion is still in the Stone Age. The ducted fan holds all the promise as far as

(Continued on page 82)

Dee Bee CARDINAL R-T-F KIT

Please write or call for price.



PRO-START ENGINE STARTER \$19.95



Very light weight with reduction gear box. Enough torque for all engines.

NEW — DuBro SKY- MASTER R-T-F KIT List Price \$59.95 Hobby Lobby price \$49.97



62½" span, 610 sq. inch area. Low wing contest-capable multi. Extensive hardware as in other DuBro kits.

"GLASKIN" WINGS \$29.95 To fit: Dragon Fli, Kaos, New Orleanian, Eyeball, Cutlass (MAN), New - Banshee Wing Cutlass Supreme, Triton, Sun Fli IV, Citron (Lanier), Intruder.

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Your choice of one of these \$10.95 Midwest Profile kits: P-51 Mustang or, ME-109 or, P-63 King Cobra and \$16.95 Fox 35 Stunt Engine. Total List Value \$27.90.

Special Price (Until November 30, 1971) Only \$19.97

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\$9.95 Midwest "SNORKY" Beginners' Control line kit, 36" span foam wings and \$9.95 Fox 15 engine. TOTAL LIST VALUE \$19.90.

Special price Only \$13.97 (Until November 30, 1971)

CHRISTMAS GIFTS FOR R/Cers



We have made up a list of Christmas gift items for R/Cers. Most of these items are in the \$10 to \$50 price range and our list is designed for wives of R/Cers who call

us up every year for gift ideas for their husbands.

Please write or call up for this list right away because we do run out of some items just before Christmas.



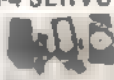
TRY US OUT: G.P. Did! "I couldn't believe how fast you sent my last order. I received the order within 6 days from the time I sent it, and that included Labor Day weekend." G. P., Pueblo, Colorado.

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RS-4B KIT	\$15.97
RS-4B SEMI KIT	\$19.97
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S4D SEMI KIT	\$19.97
S4D ASSEMBLED	\$24.97

World Engines S-4 SERVO Mechanics Kit \$2.95 Includes case, screws, gears.



Blue Max CHANNEL KIT

\$159.00

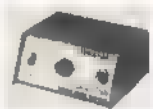
The Blue Max SEMI kit is the least expensive way to acquire a reliable full house deluxe digital. Since the difficult assembly of the printed circuit boards has been done at the factory, you only have the mechanical assembly and p/c board interconnects to accomplish. Complete with semi kits for transmitter, receiver, 4 servos, all ni-cds, charger, wiring harness, instructions.



ASSEMBLED KIT SHOWN

NEW — Dremel No. 219 SPEED CONTROL \$16.95

While this was designed for use as a speed control for the Dremel Moto Tool, several other uses were suggested in Sept. RCM: 1. Reducing heat of soldering iron so it can be used for "close quarters" Monokot-ing, 2. Adjustment of internal heat of glue guns, 3. Closer adjustment of Saelector iron heat.



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ON THE SCENE

EUROPEAN CHAMPIONSHIPS

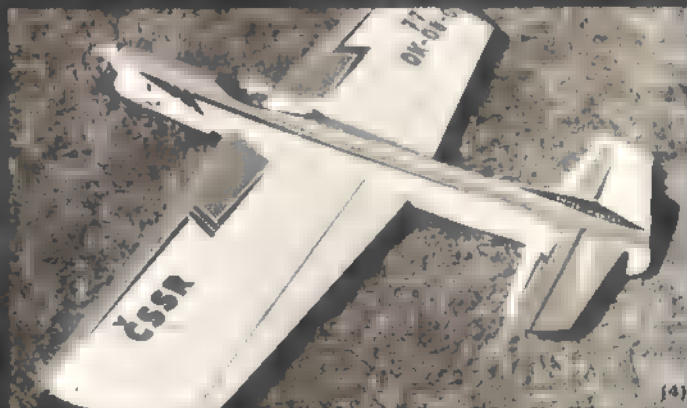
BY STEVE BLAKE

From 14 nations 101 competitors travelled to the southern Hungarian town of Pecs, to compete in the first-ever control-line championships of Europe. Superb flying facilities were provided by the local club at their permanent headquarters. The weather was excellent for the entire meet with high temperatures, clear skies, and light winds.

This was the first international competition in which silencers have been required for stunt models. Most fliers seemed to have followed the spirit of the new rule, by producing "guide" silencers, rather than "legalizers." The trend to large models flown on long lines is clear, there being only three or four Nobler-sized models in a field of twenty-two. Winner Joseph Gabris, Czechoslovakia, flew better than ever, his familiar "Super Master" looking smoother now that a silencer has been fitted.

With the Russians failing to compete in Team Race, the competition was wide open. As usual there was much controversy over the conduct of the event. A lot of whipping was allowed throughout the heats, contributing to very rough flying. Fortunately, the semi-finals and finals were run strictly and produced some good racing. The winners, Nore/Eckholm (Finland), scored times which were slow as compared to the incredibly fast Russians.

Speed was perhaps the most significant of all three competitions, in that Europe now appears to have an answer to the T.W.A. in the Rossi. The availability of the relatively inexpensive Rossi engine has encouraged many new names to fly speed. With the Italians—Fontana took first—recording speeds over 149 mph in practice, next year's World Championships should be an intriguing confrontation.



(1) Stunt circle, Team Race, behind, permanent headquarters of local club at Pecs. Clubhouse is at right.

(2) Fontana's 1971 winning speed job—half-hardwood, separate glass cow, prop-saver, pipe pressure tank.

(3) Fastest team racer (Hastling/Geschwendt, Denmark) 100 mph to traffic, 15 eng. Picture shows 15 eng.

(4) Supr. flights, two world championships. Also won at Pecs.

(5) Typical European team job Baumgartner, Austria's 15 straight wheel, metal.





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NEW! CG RETRACT GEAR

LOWEST PROFILE - Main Gears are only 1" high

LIGHTEST - 2 Mains with 5/32" wire struts only 3 oz.,
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BROADEST BASED for best distribution of stresses, both
fore and aft, and laterally

TOUGH - Made of rugged nylon moldings, best for
absorbing vibration and stress. Large
bearing surfaces.

SHORTEST TANK COMPARTMENT - Nose Gear needs
only 5 1/2" for a typical "60" installation.

SIMPLEST - Main Gear has only 11 molded parts,
11 springs, 5/32" music wire strut, 4 screws.

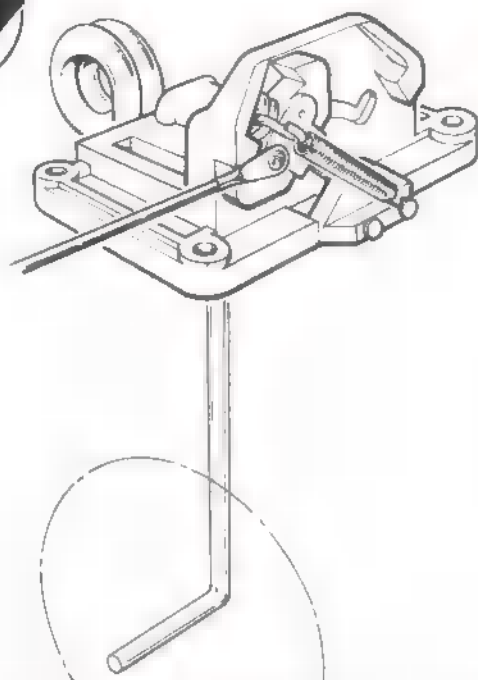
EASY Installation or Strut Removal - Low actuating
force required - one servo can actuate all three units.

COST?? Unbelievable! But True!

Special Low Introductory Price

Pair of Main Gear Retracts - \$ 9.95

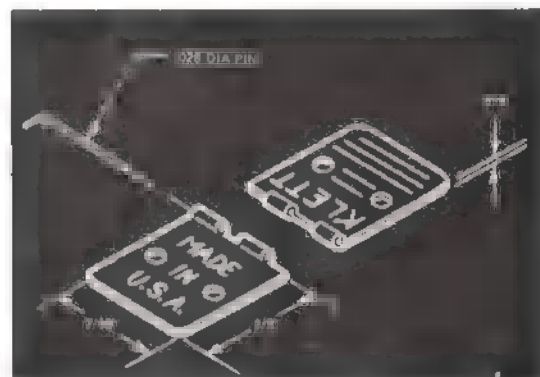
Set of Nose Gear & 2 Mains - \$19.95



KLETT NYLON HINGES— THE NEW BREAK-THROUGH!

Designed and Manufactured by Roy Klett, originator of the
World-Famous RK Hinges!

When the RK Hinges were first introduced several years ago, they
were instantly accepted by modelers everywhere as the answer for
smooth operation of control surfaces. Very shortly they were copied
by manufacturers in the U.S. and in other parts of the world. The
quality, however, has never been equaled because of the exceptional
care and attention to detail by the designer, Roy Klett. Now, he has
designed and is manufacturing his new RK2 Hinges which are smaller
and extremely strong—and so thin that all you need is a knife slit
for them. Note the dimensions, especially the thickness. These
hinges are the absolute top quality, yet the price is only \$1.95 for
15, and \$1.10 for 7. Exclusively marketed by Carl Goldberg Models.



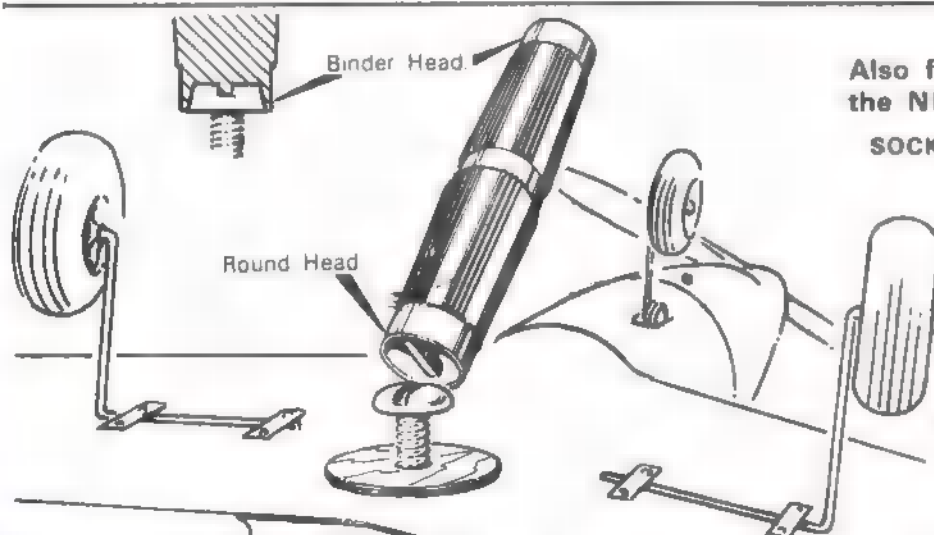
Also from Roy Klett the NEW KLETT SAFETY DRIVER

SOCKETS DOWN ONTO SCREW HEAD
—CAN'T SLIP OFF AND
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One end takes Round Head Screws,
other end takes Binder Head.

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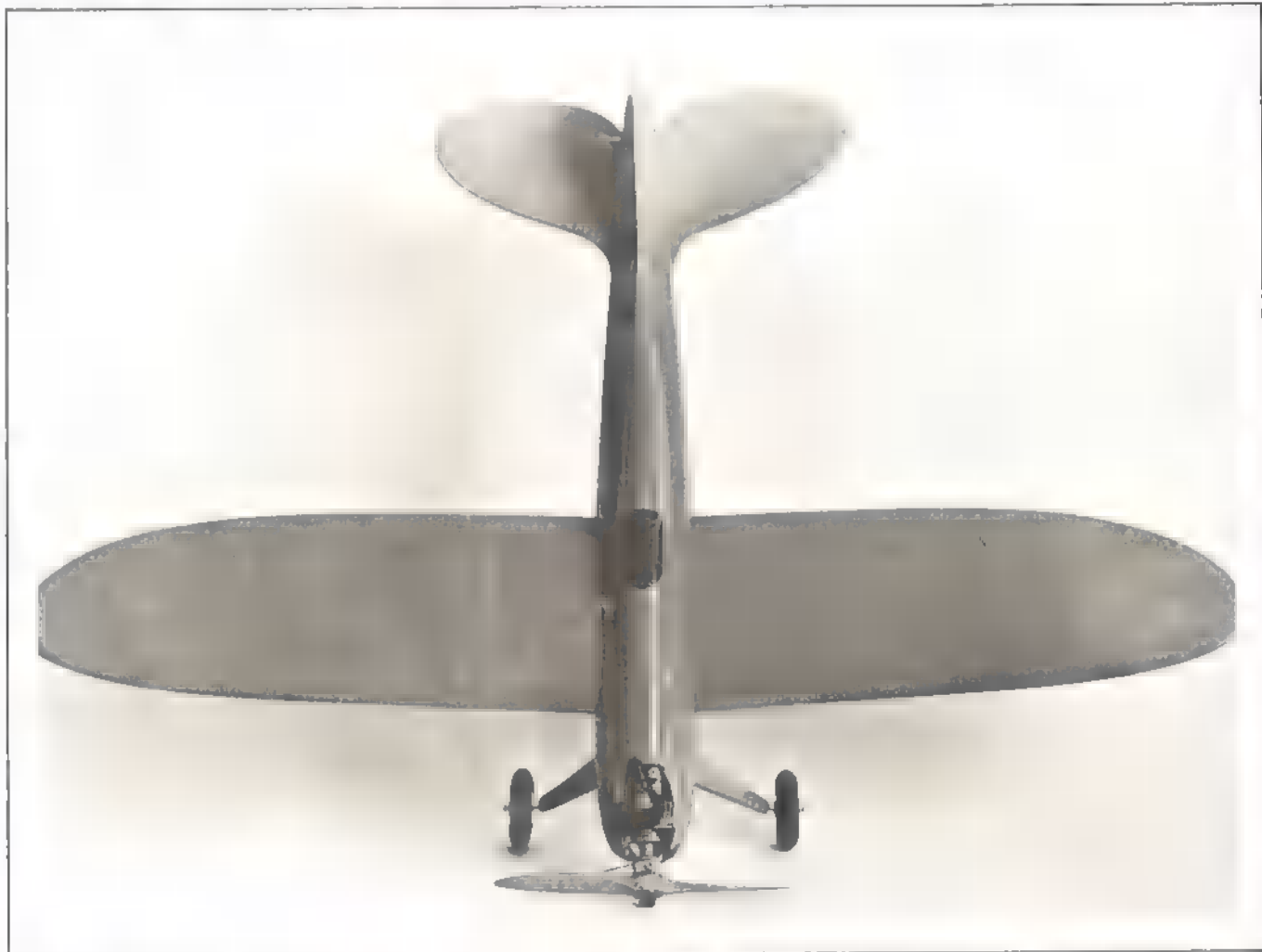
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fireball

In 1940 the immortal Jim Walker turned the modeling world upside down with the invention of U-Control. Here's authentic plans of the plane that did it—still a pretty fair stunter.

by BRUCE LUND



While rummaging about the attic for some items, I came upon something that really brought back memories. Covered with years of dust, but still recognizable, was my first U-control model Jim Walker's Fireball. The dope was cracked and faded, the rubber wheels rotten and the canopy had turned yellow with age.

It had been almost thirty years since I had given up free flight to try this new-fangled type flying called U-control. It was so new that no one in our area knew anything about it.

As I remember it, this kit was of very good quality. The fuselage was rough carved inside and out, the tail was cut out as were all other parts. The parts were not die cut, but were saw cut. The wing skins were printed with rib locations. No plans were provided as such; however, a pictorial sheet was supplied showing each construction step, picture by picture. It was sufficient.

Flying UC in the early days was a real

challenge. Remember, this was before anyone thought of engine offset, weighted wing tips and wedge fuel tanks. Just getting this engine cranked was a challenge in itself. The old ignition engines could be real cantankerous at times. They were heavy and under-powered, had low rpm, and required the added weight of the coil, condenser, switch and batteries. Our fuel consisted of 70% white gas and 30% outboard motor oil.

If one could get the engine cranked, take off, fly straight and level till the fuel was depleted and survive the crash landing, he had done something to be proud of. You may laugh, but I can remember when I won a contest by looping my Fireball.

As experience was gained, all of this changed. Jim Walker worked with the design for quite some time. When the two-speed engines became available, he started his "Sabre Dance" routine, letting the model hang by its prop and move back and forth at will. An even more unbelievable feat was

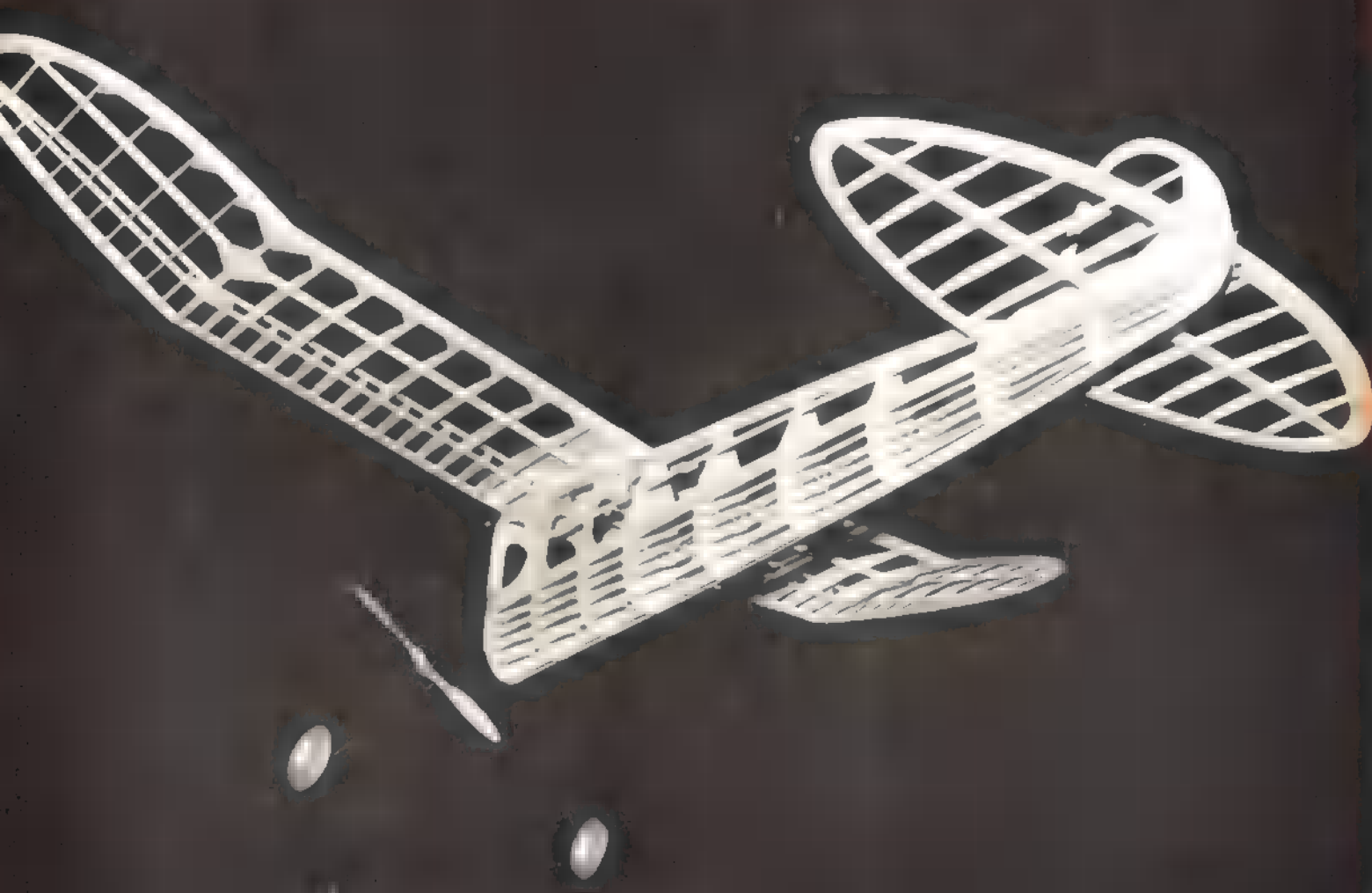
flying three planes at the same time—one in each hand and one tied to a football helmet. He also flew from water with single-float and twin-float Fireballs. Jim Walker really started something. It's too bad he isn't around today to see how model aviation has progressed.

While reminiscing with my friends, I found that some of them didn't know what a Fireball was—especially the younger fliers. Over the past few years I have noted several letters to the editor in magazines asking questions about this model. I decided it was time to do something about this and let the present generation in on a little model aviation history. It would mean disassembling my model to obtain patterns from which a set of plans could be drawn, but since the model was not flyable in its present condition why not? If any of you choose to build the Fireball, it is sure to stir up a lot of discussion on the flying field.

(Continued on page 57)

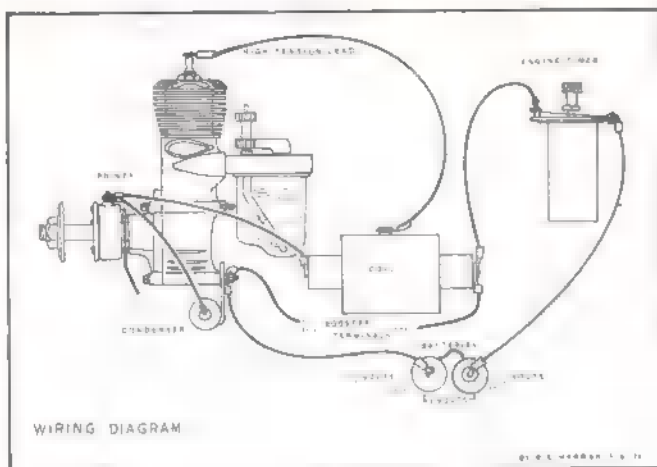
brooklyn

VIVELL-POWERED OLD-TIMER IS STRAIGHT
OUT OF A RECENTLY FOUND ANTIQUE KIT.
PLANS DRAWN FOR SCRATCH BUILDING.



dodger

by ROBERT HARRAH



In 1941, Sal Taibi designed this plane and named it "The Cadet." That same year Brooklyn went crazy when the "Bums" won the pennant. The Brooklyn manufacturer, H & F Model Airplane Co., decided to capitalize on the Dodgers' triumphant year by changing the name of the plane to "The Brooklyn Dodger."

This Old-Timer has a list of winners too long to mention and is still winning. Sal still flies one at all contests he enters, along with his famous Starduster 900.

The revised version has maintained all of the aerodynamic qualities of the original. The only major change is the addition of a DT (dethermalizer) and there are some minor structural changes as well. The Old-Timer that may seem so foreign to the modern builder is really not quite so outdated. This became especially noticeable when an effort was made to update what Sal had done thirty years ago.

Although it is no longer produced, I was fortunate to find one of the original kits which I used as a guide and then repacked for the collectors. This kit, complete except for the power system, was packed during World War II. The patriotic packaging—red, white and blue with a flag printed on the box—was a common practice during those years, as were the red fiberboard for the firewall instead of plywood, and corks substituted for the metal caps on the dope, glue and colored dope bottles. In this respect one could refer to that period as the good-old-days.

It may be that the old-timers are more aware of these changes, but I can remember how many *Liberty* magazines and others that had to be sold to buy a kit and engine. They sold for 5 cents and our profit was 1½ cents. When the end of each week came we would add up our pennies, go to the model shop and drool over the items we were saving towards, and then go out and sell a little harder. After

all was saved and the last penny counted out we would treasure every piece and part of our purchase. Then came the big disappointment—the kit wasn't complete, so we would sell some more to buy the extras. Maybe this is one of the reasons, besides its graceful and majestic flight, why an old-time plane is looked upon with such reverence.

The other great disappointment of those days was the fly-away, unless it was at a contest and we won. I often wonder why none of us were smart enough to invent a DT. We used to brag how we would never build a kit. We felt we had to design and scratch build in order to be a real modeler. (There was some merit to this, but I think it was partly a defense because we couldn't afford a large kit.) Most of us in my area won our first big kits and new motors by placing with our scratch-built rubber models in contests. I still remember my first. It was on a foggy morning at Point Mugu (now Port Hueneme) and I won a Huskie Jr., class A engine and a class A Skyrocket Kit. And do you know what? I wasn't the least bit ashamed to build that kit.

Since this kit is not available I hope you are not ashamed to build a scratch-built. Before construction starts, better plan to do some searching at your local hobby dealer if you are going to use an ignition system and do not already have one. The wiring diagram shows all necessary parts. The Austin timer and battery case is still in production, the coil is still being made and condensers of the old type (Ford 11A18801) are plentiful. I like the new lighter types that are available at local electronic or radio supply houses—for small engines, 23-and-under, (6PS-P10±.1 10% 600DC). The original design of this ship was as a class B and C. The Ohlsson 23 was recommended for class B, but it was generally

(Continued on page 66)



An Old-Timer is a sport model by today's standards of performance. Maybe this explains their renewed popularity.

By Popular Demand!



**JR. AMERICAN
MODELER**

Special!
Build your own Rocket!



On November 1, Potomac Aviation Publications, publishers of the American Aircraft Modeler will release a entirely new magazine dedicated entirely to the beginning modeler, whatever his or her age, but focused primarily on the 12- to sixteen-year-old group.

Entitled the JR. American MODELER, the magazine will be a bi-monthly for the first six issues, at which point it will be monthly. First issue is November-December 1971, sale through subscriptions, hobby shops, and other easy-to-find sources. Price will be 60 cents, a subscription for 6 issues will be \$3.00, for 12 issues \$6.00. Contents will emphasize model airplane building and flying but will include appropriate boats, cars, and a variety of interesting projects with educational and scientific value. Special attention will be given to all aspects of how-to-do-it.

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An international plane for FAI pattern flying.
Although big, it is of simplified construction and builds quickly.

CANUS



The Canus is designed for the FAI Pattern. It performs graceful international maneuvers with the smoothness and precision needed to win—increase the control surface throws and it will also win for you in the AMA Patterns. (If it suits your style, retracts may be added.)

The name Canus is also international, as it is a contraction of Canada and United States. The basic lines of this design are straight and simple, to be totally covered with Super MonoKote.

The vital statistics of the Canus include: (1) Wing span 66", (2) Wing area 675 sq. in., (3) Fuselage length 52" or 79 percent of the wing span, (4) Aspect ratio 6.4 to 1, (5) Airfoil NACA 0015, (6) Wing taper approximately 1/3 LE and 2/3 TE, (7) Tip chord approximately 65 per cent of the root chord, (8) Dihedral 1 1/4" under each wing tip, (9) Weight 6 1/2 to 7 1/2 lb. (The

maximum weight of this aircraft under FAI rules is 3 3/4 lb. including fuel.)

A muffler was included in the design of the Canus. If you don't use one, be careful—you could end up a little tail heavy. A long landing gear is shown on the plans for those of you who fly from deep grass or rough fields. It could be shortened for hard surface flying.

In flight the Canus is very groovy, but responds quickly and positively to control commands. Knife-edge flight is very easy; in fact, this plane knife-edge loops! It penetrates wind well—one reason it flies smoothly through turbulence, while other designs are noticeably affected.

The Canus has a realistic appearance and a quick, easy, light construction without sacrificing strength. With its moments, areas, shape and force setup, it is a superior performance pattern aircraft.

Construction

As the actual construction is typical of many pattern planes, it is not necessary to go into too much detail. No details are given for the installation of fuel tanks, radio systems, pushrods, etc. due to the large variety available on the market today.

Install spars, landing gear blocks, trailing edge strips, etc. into foam cores and cover with 1/16" balsa sheet. Join wing halves using ply spar joiners and epoxy. The dihedral is 1 1/4" under each wing tip. Wrap center section with 5" wide glass cloth. Then drill 3/8" holes for hold-down bolts. Insert short lengths of 3/8" dowel with predrilled 1/4" holes for

by ROY FOOTE

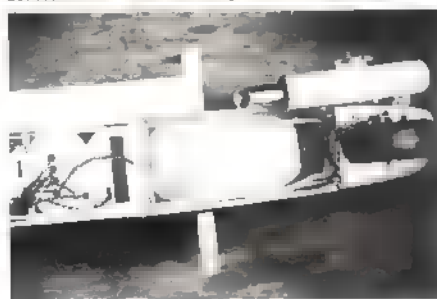
1/4-20 nylon bolts. Do not drill front dowel holes at this time. Cut and sand ailerons and tip plates to shape.

Most bulkheads are 1/8" thick, made up from two layers of 1/16" balsa sheet cross-grained. Laminate first; then trace and cut out bulkheads. The remainder of the bulkheads are plywood with thicknesses specified on plans.

Cut out fuselage sides including stab slots. Add 1/32" ply doubler up front and 1/16" balsa doubler in stab area. Do not cut slot in stab doubler at this time. Add 3/16 x 3/16" strips and the sides are ready. Draw a center line on each side of the 1/16 x 3 x 44" balsa sheet crutch. Mark out "F" bulkhead locations on one side, and "T" bulkhead locations on the other. Before gluing any

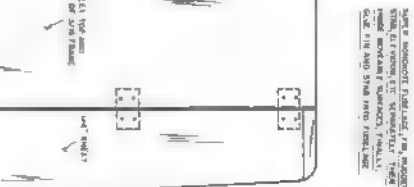
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A unique approach to front-end mass is bottom hatch location. All innards serviceable. Note battery above wing LE.

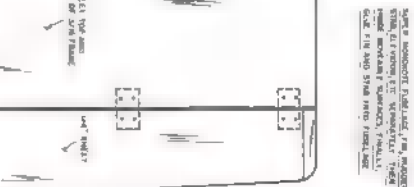
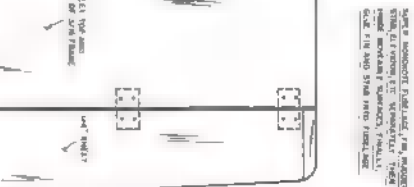


Radio installation is compact. The fourth operates the cable for nose wheel brakes. Use of servo tray recommended.

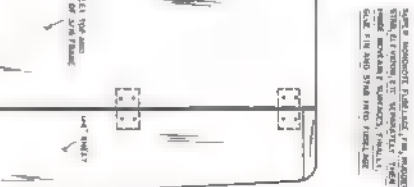




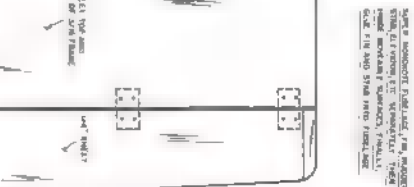
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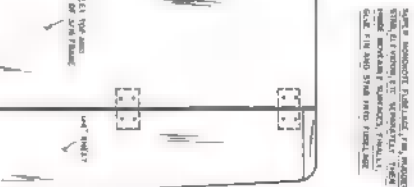
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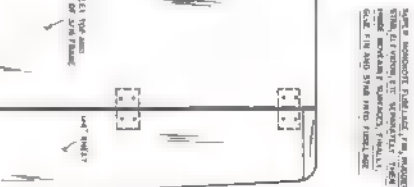
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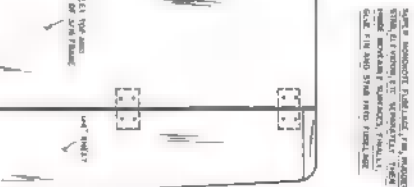
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1990	16
2000	18
2010	19
2020	20
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2050	20



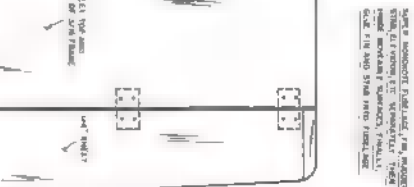
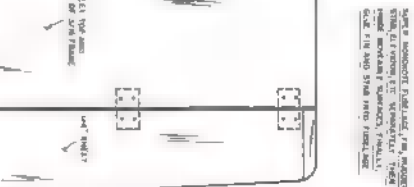
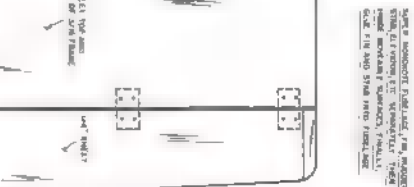
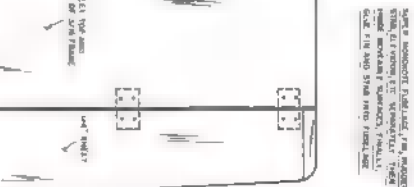
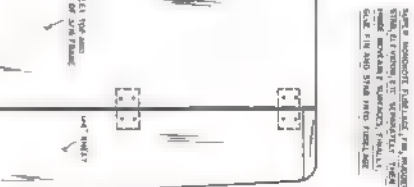
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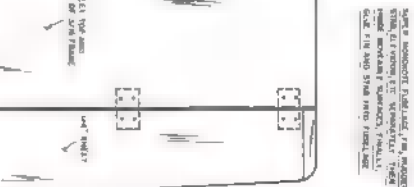
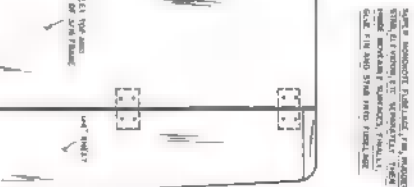
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last biplane fighter

THE NAVY AND MARINES HUNG ONTO THEIR BELOVED GRUMMAN F3F SERIES ALMOST UNTIL PEARL HARBOR.



by DON BERLINER

22 December 1971

Of all the glamorous eras of aviation, perhaps none will ever surpass the middle 1930's, when the high-performance biplane fighter ruled the peaceful skies. The British had their beloved Hawker Fury, the Italians, their graceful Fiat CR.42, the U.S. Army Air Corps had its Curtiss and Boeing pursuits, and the U.S. Navy proudly brandished its wonderful Grumman biplanes.

It was a time of unreality, for the usefulness of the combat biplane was fast drawing to a close. Nimble, lightly armed and relatively slow two-wingers looked majestic as they wheeled in close formation over fascinated crowds gathered to watch impressive annual air displays at Hendon, Kelly Field and Pensacola. But soon the nations of the world would turn away from thoughts of gentlemanly air duels, to the deadly serious battles where speed and firepower counted far more than did the wind whistling through the guy wires.

Long plagued by tradition, the U.S. Navy was among the last to face reality and drop the biplane fighter in favor of what everyone else had observed was superior: the monoplane. The Army went first—to the fixed-gear, open-cockpit Boeing P-26 and then to the Curtiss P-36 Mohawk. The British were on their way to the Hurricane and Spitfire. On the other side, the German Messerschmitt BF-109 and the Japanese Oscar and Zero were about to end any chance of the biplane remaining in vogue.

But the Navy hung on. It had been happy with earlier Grumman biplanes—the FF-1 and the F2F, and naturally went for an improved version of the F2F, ordered in late 1934. Basically, it was an F2F with a 650 hp Pratt and Whitney R-1535 Twin Wasp Junior engine. The new F3F, like its predecessor, was hefty, full of wires and struts, and as lovable as an old spaniel.

The first one flew on March 20, 1935, and disintegrated two days later in a test dive. A second XF3F-1 prototype flew on May 9, was delivered to the Navy's Anacostia Naval Air Station near Washington, D.C. on May 13, and crashed on May 17—failing to recover from a flat spin. So far, two airplanes had lasted a total of ten days, but enough had been learned to justify proceeding with the program, and the third prototype arrived at Anacostia on June 20, 1935. It began its Navy trials on July 10 and was accepted for service on August 1st, no time being wasted once the

original bugs had been eliminated.

Barely six months later, the first production F3F-1 was delivered to the fleet, and its successor ~~was~~ already on order. At first, the XF4F-1 was to have been a completely new biplane. Before construction was begun, however, Grumman engineers turned their thinking to two other ideas for an XF4F: an F3F with more power, and a totally new monoplane. The entire XF4F-1 plan was eventually dropped in favor of the XF4F-2, which was to become the famous Wildcat that ended Grumman's romance with two-winged fighter planes.

But that was still in the future, and Grumman was busy building biplanes. Between January and September of 1936, 54 F3F-1's were delivered—the first batch going to the U.S.S. Ranger to replace the Red Rippers' FF-1's and F2F-1's. In late July, 1936, the prototype XF3F-2 was delivered to the Navy, but troubles with its 1000 hp Wright Cyclone GR-1820 engine delayed acceptance for many months. Finally, in March, 1937, an order for 81 F3F-2's was placed with Grumman. The first one was received by the Navy in July and accepted for service in November.

The prototype XF3F-3 was delivered in October, 1938, and featured several changes aimed at increasing speed: a curved windshield, modified wing leading edges, and a new engine cowling. An order for 27 of the improved fighters was awarded, with the first being delivered in December.

In the meantime, however, the Navy had been proceeding with development of the monoplane fighter. In June, 1936, the prototype Brewster XF2A-1 Buffalo was ordered, and early in September, 1937, the Grumman XF4F-2 Wildcat made its first flight. The first Buffalo flew in December, 1937, followed shortly by the arrival of the prototype Wildcat at NAS Anacostia for Navy acceptance trials. In June, 1938, a contract was signed for 54 Buffaloes, and then, at the end of the month, the radical twin-engined Grumman XF5F-1 Skyrocket was ordered by the Navy. Things were moving fast.

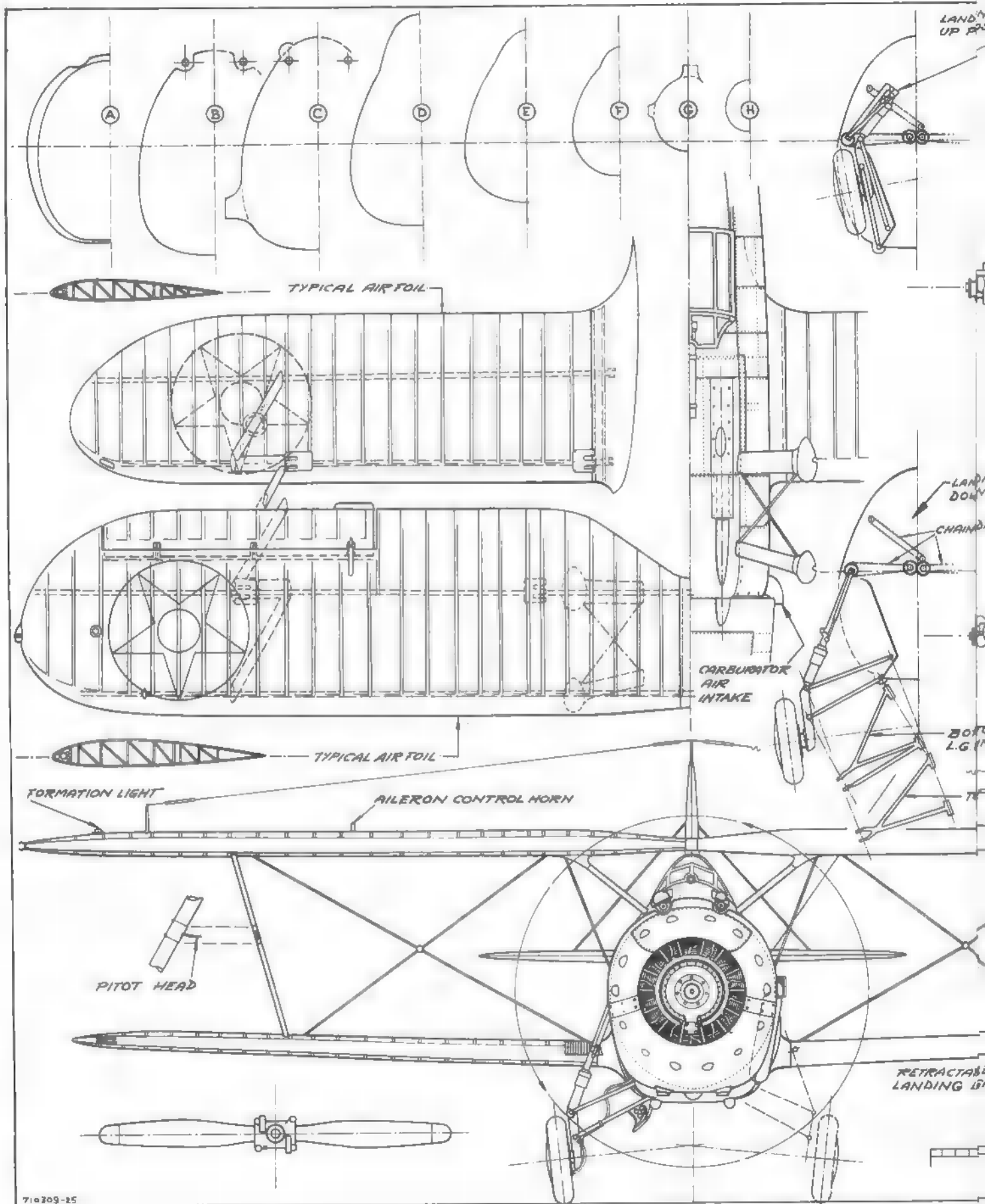
Still, the F3F's were moving down the assembly line onto the flight line—to every fighter squadron in the Navy and Marine Corps. Great aircraft carriers like the Saratoga, Yorktown, Wasp, Lexington and Enterprise all boasted squadrons of the jaunty

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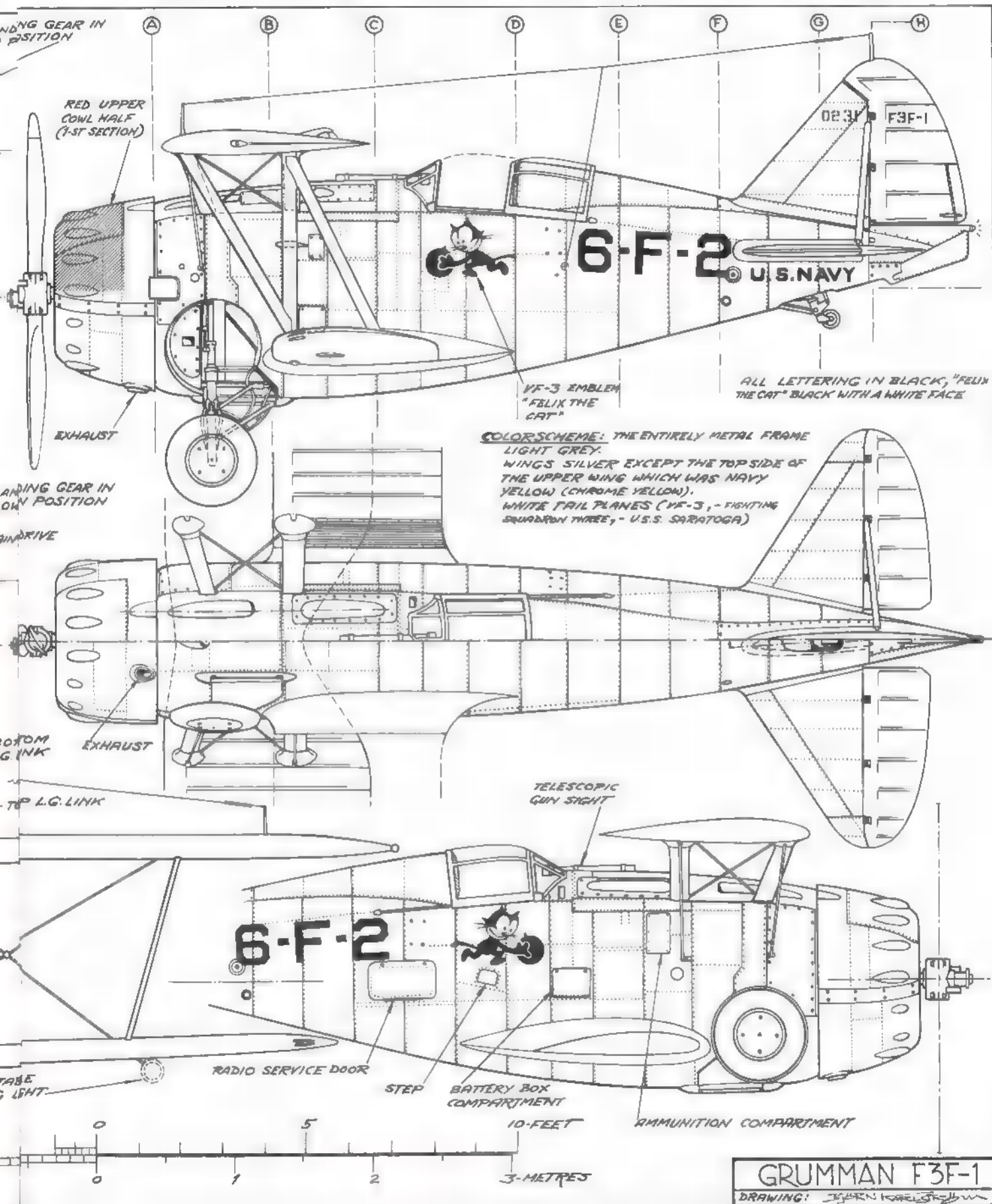


Wheels down to keep formation with a slower camera plane, an early F3F-2 with the then-sensational 1000-hp Wright Cyclone engine.

Photos by Smithsonian Institution



710309-25



HOW CHEAP CAN IT GET

by ED SWEENEY



Hutch Pierce launching model.

This glider was intended as a free-flight toy,
but adapts easily to rudder-only RC. A fine and long flying combination.

This sport of flying RC planes is known for being expensive and complicated. Recently, there has been a revival of interest in single-channel equipment and rudder-only planes to offset the complications and expense of multi-channel. Rudder-only is relaxing, whereas digital is nerve wracking.

The simplest and least expensive form of RC seen yet is a glider manufactured as a toy by Eldon who markets it for about \$3.95; at some discount stores it costs only \$2.00. The radio set shown is the ACE R/O Baby Combo which retails for \$69.95—the lightest and smallest radio set of any kind available with a superhet receiver.

It took about two hours to work out and make the complete radio installation in the glider. Constructed entirely of solid styrofoam, the glider merely slides together. It should take the experienced modeler about 5 seconds to assemble; the least experienced might take 10 seconds. This is a true ARF. Using it for RC takes a bit more time, as it needs a rudder. The surface was cut out of the fin to leave adequate material to retain the stabilizer. We probably should have cut out the rudder to also have a counter-balancing area ahead of the hinge line, but it has not proven necessary—the little baby actuator moves it happily. Two Kavan pin-type hinges, which were selected for very free movement, were used to attach the rudder.

Through the fin, just under the rudder and above the stabilizer, a 1/16 ID aluminum tube was pushed through the foam to be the bearing for the rudder torque rod. This rod angles on to the actuator buried in the foam above the wing. Another tube was pushed through the foam just behind the actuator as the forward bearing. A "U" shaped hook was bent in the torque rod to engage the actuator output arm. A "U" hook on the rudder engages an arm of the torque rod for rudder connection.

There are four parts to the ACE Baby unit. A cavity was cut out of the foam front fuselage using a Dremel Moto Tool to accommodate each part. Specifically, the battery up front, then the switch, receiver, and actuator. The parts were taped to the fuselage first to establish proper balance. After locations were established, the holes were made to suit.

Actuator installation was simplified by also using the actuator's assembly bolt and nut to attach two plywood plates. The hole in the fuselage snugly holds the actuator in place by these plywood pieces. The output arm on the actuator must be bent to a new position so that the arm is parallel and in line with the arm on the magnet. Look at your actuator and this will make sense.

For nose protection and strength, a strip of

1/8 x 1/4 spruce was epoxied to the underside of the nose as a landing skid and tow hook mount. The strip of spruce must extend from below the middle of the wing to as far forward as possible. An adjustable wire tow hook screws in place on the spruce. It is positioned about one inch behind the wing leading edge. Move it back 1/4" for calm weather and forward the same distance for windy weather.

Last operation before flying is to use plastic 3M tape to decorate the glider and protect it. Wing leading edge must be covered with tape. I also used a strip of nylon packaging tape around the whole fuselage from nose to tail on each side. It takes the danger of breakage out of bad landings. When putting this nylon tape on, you can also straighten your fuselage (if it is warped from molding, as mine was).

Does it fly? Sure. Being so light it goes up with the slightest hint of lift; without lift its high drag brings it down steadily. I find I can get a tow-launch of over 300 feet using light fish line. That's high enough for finding thermals.



Rudder shape and mounting shown here. Note location of torque rod's bearing thru fin.



ACE Baby system is pure simplicity. The only plug is for charging. Excellent long range.



Actuator installation is tight slip-in fit. Rubber seating tape limits actuator movement.



That's all there is to it. Four holes made in fuselage for each component. Charger is part of the ACE package. Can it be simpler?

WHERE THE ACTION IS

FREE FLIGHT

BOB MEUSER
SPORT

Boeing Scholarship Contest: Marty Thompson, 16, of Livermore, California, beat 70 other contestants in the second annual Boeing Scholarship Contest, held in Seattle on June 19-20, to win the Grand Championship and the \$1500 scholarship that accompanied it. Marty took first place in Indoor Hand Launch Glider, Indoor Easy-B, Design Craftsmanship, and Outdoor Unlimited Rubber. A few points behind Marty were Seattle-ites Phil Hainer and Rick Sironen, both 16 also. Rick, you may recall, won the 1970 contest, and a three-view of his winning Nordic towline glider appeared in this column in the March 1971 AAM. Rick won Nordic again this year.

The format of the Boeing contest is rather unique, and obviously well thought out. There are three main categories: Free Flight, Control Line, and Specialty. Free Flight includes 1/2 A Gas, Unlimited Rubber, Hand Launch Glider, Cargo, Towline Glider (combined A/1 and A/2), and Helicopter. CL includes Stunt (Classes A, B, and C combined), 1/2 A Profile Proto Speed, CL Scale Racing (Goodyear), Navy Carrier (combined Profile and Class I), and Combined Speed/Record Ratio. (A model in any speed class may fly against the existing AMA record for that class, and points are percent of the record speed.) Specialty includes Rocket-Class O Altitude, Rocket-Swift Boost Glide, Aerobatics (Class A Pattern only), Indoor Hand Launch Glider, Indoor Easy-B, and Design Craftsmanship. In the latter, the model must have flown in an event, and models are judged according to innovation, execution, quality, finish, accuracy, etc., as well as supplementary written material submitted by the contestant. Events flown in accordance with the applicable AMA or NAR rules, and contestants must be members of those organizations, of the Model Aeronautic Association of Canada. Contestants may enter any number of events; however, a maximum of three events in any one category will be scored. Points are scored on the basis of 25 for 1st, 20 for 2nd, etc. The contestant's best four out of nine possible events counted toward the championship.

The contest is open to anyone who is less than 19 years old on July 1. If you cannot qualify for a scholarship by being a super-genius or super-athlete, you would do well to consider entering Boeing's 1972 contest; Boeing will provide a home-away-from-home for youngsters traveling solo. For info, write Boeing Management Association, P. O. Box 3999, Seattle, Washington 98124, Attn: Mermann Clegg, Org. 2-1009, M/S 85/48.

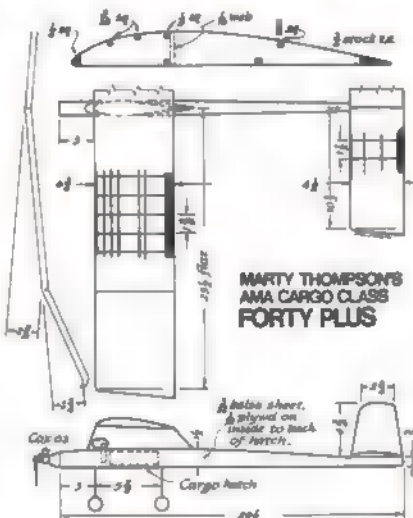
I Go Cargo: As readers of this column may



Four-wheel gear — one-blade prop distinguish Marty Thompson's Cargo model—thermalized two minutes at Boeing Scholarship Contest.

have noticed, we have a soft place in our headbone for the Cargo event. It seems to have many of the virtues of Scale, Old-Timers, competition Free Flight, and sport flying all rolled into one. Besides, it is one answer to the flying-site problem.

The idea is to see how much gross weight you can put up for a 40-sec. flight on a 20-sec. engine run. Models are limited to a 48-in. span and .025-cu. in. engine displacement. Cox Tee 02 is the ticket—all-up weights come out 15 to 25 oz. Getting them off the ground without ground-looping is a problem, and a conventional landing with a pair of rubber-soled wheels is a sure ticket to a ground loop. The old pros from the PAA Load and Cargo events of yesteryear say the cure to ground-loop-osis is a trike or

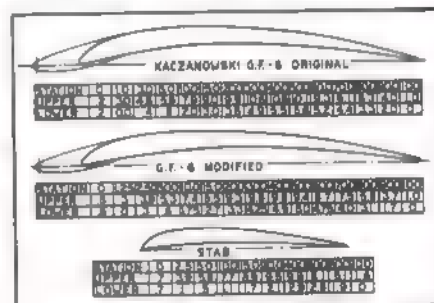
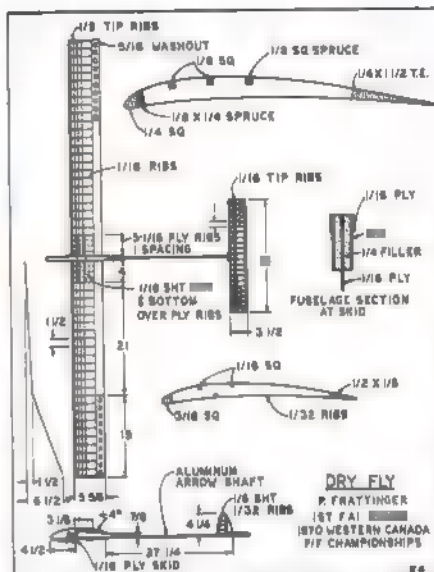


4-wheel gear, large wheels, especially if the takeoff area is rough, and wheels that will slide sideways instead of tripping. Wheels should be metal, plywood, or perhaps even teflon-rimmed or on casters. Configurations include—in addition to the conventional arrangement shown in the three-view of Marty Thompson's Forty Plus—biplanes, tandemwings, engines mounted in pods.

Caution: Marty's Cargo thermalized for two minutes on his last flight at the Seattle contest, so a dethermalizer is not as silly as it might seem! Starduster 350 wing and tail planforms, but with Marty's own structural design and anti-vortex tips, the Forty Plus won the Design Craftsmanship award and placed second in Cargo, a "smidgin" behind Rick Sironen's winner at Seattle.

BOB STALICK RUBBER AND GLIDERS

Thermal Glider: This month's featured A-2, with its light extremities, is an example of the "state of the art" in thermal-seeking Nordics. Along with the Dry-Fly is the full set of



coordinates for the highly-rated A-2 section, the GF-6, considered by many to be the best still-air airfoil in. The drawing indicates the position of the outrigger turbulator, made from heavy monofilament or shirring elastic. These turbulators seem to be regaining popularity, but their primary drawback is a susceptibility to damage on landings. This can be solved by suspending the cord in front of the wing by a soft metal wire, from a paper clip, that hard landing damage can be repaired by simply bending it back to shape.

Thermal Seeking: Modelers who frequent the contest circuit these days are confronted with many forms of thermal-sensing devices—from fancy electronic gadgets to soap bubbles wafting in the breeze. One of the more fool-proof and easily-read devices is a high (12 ft. higher) pole anchored into the ground with a 20-ft. long thin mylar streamer fixed to the top. Standing downwind, the modeler can "see" the air as it approaches him. When the end of the mylar begins fluttering and jumping up, it indicates good air is on its way. If the air is good enough, it can be felt by the unpracticed newcomer. A fancy GF-6 airfoil isn't even necessary, for even the crudest of zip-zip foils will thermal for a max.

Free fliers who want to know more about thermal-seeking using the mylar streamer method should obtain a copy of the NFFS 1971 Symposium, edited by AAM Columnist Bob Meuser, from Annie Gieskiel, 1333 So. Franklin St., Denver, Colorado 80210 for \$3.50.

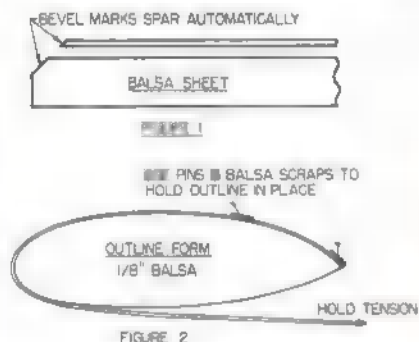
Spinning Out Of Thermals: The bugaboo of some models is their inability to stay in a thermal. Some, if designed and built properly, never have this problem. Look carefully at this month's plan—light wings and wing warps are built in. If spinning out of thermals has affected you, you may need wing warps, too. Lighter wings might be needed as well. Try warping the inside wing down first (the wing toward the center of the glide circle). Warp the trailing edge down a bit by heating the

panel over ■ electric plate and twisting. Start with small amounts—1/16" on a Nordic ■ Wakefield is a good starting point. You may need more, but you can find out via trial and error. After you've heated and twisted, then remove from the heat and quickly rub the wing panel over your leg to remove excess heat and set warp.

BUD TENNY INDOOR

Prop Blades: Outdoor props are relatively heavy and rotate ■ rapidly that they must be closely balanced, but indoor props have a different balance problem. The weight difference between blades is not particularly important, but the structural strength of the blades must be closely matched.

Blade Outlines: Blade outlines ■ typically about .020" square, or .018 x .024". Such tiny wood is hard to keep track of properly—Fig. 1 shows one method. The corner of the balsa sheet is beveled before outline strips are cut from it; each outline then has a small bevel which identifies which way the strip is turned while gluing it in place.



Blade Shape: Every indoor prop designer usually has a distinctive blade shape he prefers to use. The blade outlines are preformed to this shape by using a form such ■ that shown in Fig. ■. Pin the form to a flat surface, soak the outline strips in water, and wrap outlines around form as shown. Finally, bake the whole package 20 minutes in an oven set to "Low."

It is important to remember two points: first, ■ the small bevel on each strip to get both strips turned the same way while they are wrapped on the form; second, pin the outline in place with balsa scraps to prevent damaging the outlines with pressure from the pins.

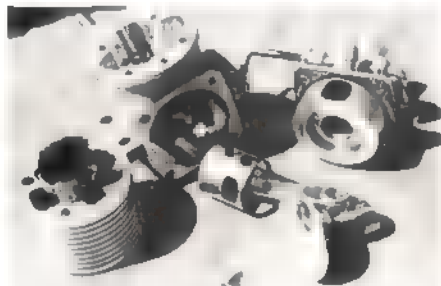
Matched Ribs: In keeping with matched spars and outlines, indoor props must have matched sets of ribs. After cutting several ribs in the usual manner, match them in pairs by size as closely as possible. Then, while building the first blade, cut ribs to fit at each station along the blade. Before gluing these ribs in place, cut the other one of the pair to the same length. By matching the ribs in length, identical blade shapes are assured. With proper matching of all parts of the prop in this fashion, an even-running prop is almost guaranteed. Often, the blades of indoor props ■ distorted an incredible amount under high power. Under this kind of stress, lack of proper matching causes uneven running and wobbling.

■■■ HATSCHEK POWER

Gentlemen, Start Your Engines: Today's top competition engines, which are revving at speeds of 25,000 rpm and even higher, were in evidence at the Free Flight World Championships held in Gothenburg, Sweden. Following the day of competition for power

models, ■ International engine-revving contest just seemed to grow out of the multi-lingual bull sessions.

Rossi engines on 7 x 3 1/2 fiberglass props turned the fastest, with American Jim Taylor's turning nearly 26,000 rpm. Fellow New Mexican, Buzz Averill, had one that turned about 25,000, ■ did Thomas Koster (Denmark) and Paul Lagan (New Zealand).



Verbitsky's disassembled engine at FF World Championships; Schnuerle porting, drum rotor, piston ports. Much dental drill work.



Compact Russian inertia starter had 50:1 gear ratio. Requires assistant to operate crank.

While it didn't turn ■ fast—probably because it had a bit larger prop—the engine built by Evgueny Verbitsky (USSR) was ■ more interesting. For the record, his rpm was over 23,000, and when Taylor put Verbitsky's prop on his Rossi it didn't do any better. The Soviet engine is a Schnuerle-ported .15 with drum-type ■ rotor, bypass ports through the piston, and a standard-type glow plug (rather than the widely-used modified Cox plug). Verbitsky did much of the internal work on the engine with dental drills, which are essentially miniature carbide router bits.

Winding Them Up: When engines ■ tuned to run at high rpm, they're just not ■ easy to hand crank as some of us might like. Also, when a hot thermal is indicated, or when you've only got ■ couple of minutes to get airborne in ■ flyoff, you want to start that mill right now!

To do this you need a starter—a rotating device powerful enough to turn ■ engine over at a couple thousand rpm. You stick the model's spinner into ■ rubber coupling (such as a short length of hose) and away you go.

Three types of power source are available: an electric motor, a gasoline engine, and ■



Full-scale aircraft and bicycle parts were combined in SkyScraper Club inertia starter project. Used here by member Eric Hatschek.

hand crank with a spinning flywheel to store the rotational energy.

Electric starters can be purchased commercially, or they can be homemade. Automotive accessory motors (for electrically closing car windows and the like) are excellent for this purpose. They're small, powerful, and operate ■ 12-V batteries (auto, motorbike, or even NiCad packs have been used). They're also cheap at many local junkyards—with prices as low ■ \$3.00.

Tom Kerr's gentlemanly starter (he doesn't even have to bend over) is mounted atop a welded aluminum stand about 3 1/2 ft. tall. A foot switch on the base feeds it the juice. Jim Taylor's simply mounts on his model box—fed current simply by pushing the spinner into it. About 1/16-in. of end play in the armature shaft is used to operate ■ Micro-switch at the back end of the starter motor.

Gasoline engines suitable for the task can be found on old lawn mowers (Briggs & Stratton), small emergency generators (Honda), possibly ■ old chain saw (McCulloch), and a number of other odd items of hardware.

The final type is the inertia starter. What's required here is a five to six in. diameter flywheel, a gear box with a ratio of somewhere between about 20:1 and 80:1, and a hand crank.

The Russian power team at the World Championships had a neat, small inertia starter with ■ 50:1 gear box and a one-piece tubular stand. Because it was so light, it required ■ helper to hold it down while in use. He also kept cranking.

As a club project, the Brooklyn Sky Scrapers recently built an inertia starter using components from ■ full-scale aircraft inertia starter (Bendix Eclipse). As acquired, it was junk (all ball bearings had to be replaced), but with the planetary gearing, clutch, and low rpm output shaft removed, it provided the needed 26:1 gearing along with ■ totally enclosed flywheel. A bicycle crank with modified pedal for a handle and the free-wheeling sprag clutch from a bicycle coaster brake made a dandy unit for winding it up. The photo shows Eric Hatschek feeding a 1/2A into it, but it handles engines right up to Class C with ease.

Walt Mooney SCALE

Scale Rubber Speed Contest: That most inventive of model clubs, the North American Flightmasters, has done it again. From the first place plaques, through the worst crash award (a model stuck through a brick wall),

to the award for the slowest qualifying time (a real live tortoise), its Scale Rubber Speed contest was really great.

An enthusiastic group of speed demons met at Russ Barrera's model museum in San Marcos August 8th and were taken to the local high school football field where the 88-ft. straight line speed course was laid out. Seventeen scale and eight non-scale entries were on hand. The Williams brothers were enlisted to work the electronic start/stop clocks and the race was on.

Astonishingly, some of the scale racers flew, and others crashed and crashed and crashed. A good lawn helped but not enough to prevent some of the models being reduced to kindling.

John Alcock's winning scale model was an all-sheet covered P-51 with a four-bladed mahogany propeller. Second was a beautiful Hughes racer by Jack McCracken. Bill Warner took third with a Caudron, and fourth was a P-38 in an all-red color scheme (except for its "Yippee" markings per the actual 5000th Lightning).



Entered in N.A. Flightmasters Scale Rubber Speed Contest, was McCracken's Howard Hughes Racer. Straight course was 88 ft. long.

Three magnificent Crosby CR-2's were entered by the SMART organization (San Marcos Air Racing Team) consisting of Granger Williams, Bill Hannan and Bill Pardoe, but were unable to qualify despite the gallant effort of Hannan's CR-2 doing slow rolls in a ballistic trajectory from start to a foot or so short of the finish.

Eighty-eight feet in a straight line is tougher than it looks, although some models, notably Warner's Caudron and Mooney's P-38, went much further. Counter-rotating props help the straight flight characteristics and worked well on Warner's twin pusher non-scale entry also.

Launching the smaller models proved a problem. One Dayton-Wright racer crashed (several pieces) twice before and twice after a successful flight, which proved it was quite stable and fast if launched correctly.



SMART team entered three Crosby CR-2's. Williams brothers operated electric start/stop clocks. Best speeds about 40 mph.

Best speeds were about 40 mph, and flight durations of three to four sec. were the rule. Glides were generally straight down.

All the non-scale entries qualified and nine scale models managed to get through the traps. These included a Caudron, two P-51's, a P-38, a Dayton-Wright racer, a Waterman racer, the Hughes racer and two 1909 R.E.P. 2bis racers. Appropriately, one of the R.E.P.s had the slowest qualifying time and was awarded the Tortoise. (Walt Mooney immediately named the Tortoise, Robert Esnault Pelterie in honor of the occasion and is studying the airflow over the tortoise's shell to see if similar streamlining could be used to help win Scale rubber speed contests.)

CONTROL LINE

BILL BOSS SPORT AND SCALE

Giant Scale: We have all heard lots of stories about how big things are in Texas. Well, here's another that just about tops them all. Ray Schiveley of Houston, Texas tells me about his 61-lb. UC PT-19—that's right 61 lbs. The plane spans 12 ft. and is powered by a 5 HP Tecumseh air-cooled outboard engine that swings a 28 1/2 x 20" homemade fiberglass prop. Construction is of 1/8" plywood, spruce, and chrome molly tubing as was the original PT-19's. Covering is dacron-coated with butyrate dope and Sherwin-Williams acrylic auto enamel.

The plane reportedly flies very well with a top speed of near 40 mph. Takeoff speed is about 25 mph. Throttle control is achieved through the use of a three-line Roberts system made twice the normal size and three sets of .021 lines. Flaps are operated by relay-controlled reversible motors. In addition, the plane is equipped with lights, instruments and a CB Radio.

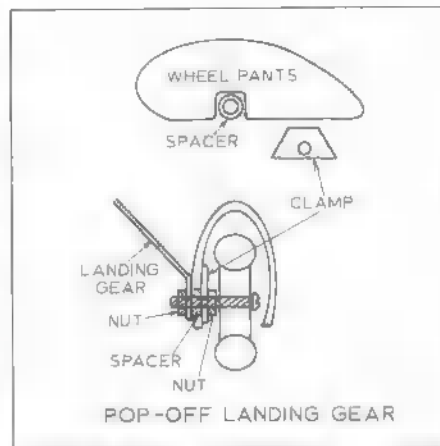
Ray also has a 1/3-size Geebies Teeny from *Popular Science* magazine and is planning a 1/3-size J3 to be radio controlled. The PT-19 and Geebies Teeny have been on the contest circuit of the Texas Gulf Coast for exhibition flying.



Sitting in Ray Schiveley's 12-ft. PT-19 is his grandson. Weighing 61 lb., ship flies 40 mph on Tecumseh engine.

Hobbybox Hint: Some people have complained that Hobbybox paint does not stick very well to a doped surface. The most frequent problem is the lifting of the Hobbybox when Scotch or masking tape is removed after the trim color has been added.

Bob Noll, Editor of the Aeroguidance Society Inc. Newsletter, has offered the following solution. After building up a good base with dope, allow the last coat to dry at least 24 hrs. Sand lightly and then brush on a coat of very thin Hobbybox filler. Thin the filler at least 75% with Hobbybox thinner. The final mix should not be much more than the consistency of the thinner. This coat will provide the necessary interface between the dope and Hobbybox colored paint. Now



sand the filler coat slightly and spray on one or two coats of colored Hobbybox. When thoroughly dry, the masking tape can be removed without fear of lifting the Hobbybox.

Flying Clinic: If your club is looking for a way to interest newcomers in model airplane flying, the Christmas season presents an excellent opportunity, as it is the time of year that many ready-to-fly planes are sold. All too often the youngster who receives a plane is discouraged when he is unsuccessful in flying it. Here's where club activity enters the picture—by providing the helping hand and experience necessary to make the gift a successful one.

A club can provide a great service to itself, and modeling as a whole, by planning a flying clinic for the ready-to-fly planes, advertising in the local hobby shop stating the time and place. Before flying, a short class on the procedures for starting engines and the operation of the controls would be in order. A little help from you will go a long way toward providing the spark that gets another airplane modeler on his way. There is no greater feeling than that of being successful on one's first time out.

Pop-Off Wheel Pants: Lt. Harold McClung Jr., a helicopter pilot in Viet Nam, states that he has ruined wheel pants that were permanently affixed to his models during rough landings. To solve the problem, he clamped the wheel pants to the landing gear. By notching the wheel pants, using a washer or two for spacers, and using a piece of light aluminum as a clamp, the wheel pants can be easily removed or installed. (See sketch for details.) With the wheel pants so attached they will pop-off if the landings get too rough.

Foam Wings: The June 1971 issue of *AAM* featured a construction article on the Crusader Stunter by Vic Macaluso. Since then there have been inquiries about the availability of the foam wing used in this model. For those that might have missed the information in the article, the foam wing cores are available from Foam-Flight, 628 W. 6th St., Mankato, Minn.

JOHN BLUM CARRIER AND PATTERN

1971 British Nats: Results are forwarded by Steve Blake on the May 30-31 British Nats. Amidst rainy, windy weather, 23 entries out of 37 flew stunt on the RAF station 60 miles west of London. Dave Day, flying a modified Thunderbird took first. Frank Warburton was second, using a Tony with OS 40; third went to Jim Mannall with his Nimrod; and fourth to Steve Blake with his original Starmaker.

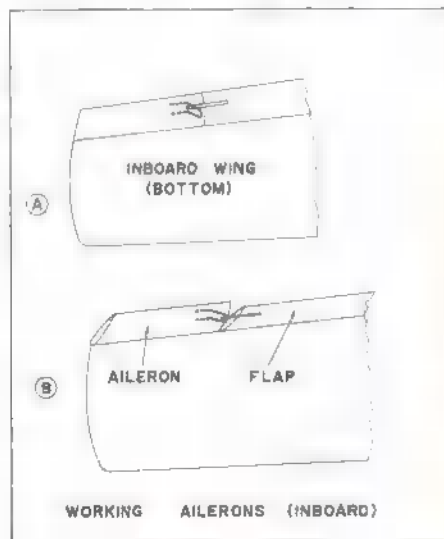


Douglas Skyraider by Andrew Keeler was second-place Carrier winner British Nats. It had ST 40 with RC throttle.

Troublesome engine runs seemed to be the order of the day.

Navy Carrier does not have wide support there as it does in the U.S. And so, there were only four entries in the British Nats, none of which made a perfect arrested landing. Derek Bird took first with a K & B 40-powered Guardian (Netzeband Design) winning mostly on scale qualification, followed by Andrew Keeler with a Skyraider (built from AAM plans) using a ST 40. Top speed was about 80 mph.

Practice Deck: Low interest in Navy Carrier in England is blamed on the absence of Carrier decks. Many local meets in the States have been run with the deck laid out in the grass. Lime the radii edges of the deck and mark the ends with crepe paper, stake the cables and it works well. Three or four cables laid in the grass make a good practice deck. When you can pick up one out of four in practice, one out of ten in competition is easy.



Carrier Line Tension: This column in the October issue depicted the outboard aileron. This month's sketch illustrates a typical setup for the inboard wing. Figure A shows the aileron and flap in the high speed position. The flap and aileron can be hinged in any conventional method. It is important that the aileron leading edge to wing trailing edge joint be shaped similar to flap, to prohibit any upward travel past neutral.

An approximately 1/2-in. long loop is formed from 1/32" dia. m.w. and imbedded in the aileron. A 1-in. length of 1/16" dia. m.w. is epoxied to the flap allowing about 1/4-in. to protrude through the aileron loop. When the flaps are dropped for slow speed, the flap wire travels to the bottom of the wire loop and pulls the aileron into down position, as depicted in Figure B. The 1/2-in. length of wire-loop can be varied to acquire desired amount of down aileron.

Stunt Plane Look-alikes: Thirteen-year-old Steve Eaton, of Schofield, Wisconsin, asks if most stunt planes are designed to give the same general appearance, citing two recently published examples. Some nostalgia may have been expressed in design, resulting in similarities to the long-famous Nobler, Ares, and the Jet types.

There is some food for thought here. This nostalgia is prompting modelers to develop semi-scale stunt aircraft. There will always be look-alikes, since some features of design are advantageous in the stunt event.

HOWARD RUSH COMBAT

The Nats: Combat at the 1971 Nationals was swept by Ohioans. Tops in Open was Jerry Haupt from Dayton with his sturdy Wedge. Jerry and his son Jack go for strong, simple planes. Good-natured guys, they take a lot of kidding about their maple machines, but they usually have the last laugh.

Bernie Varnau of Cincinnati has been flying only two years. Since I flew against him last season, I had been predicting that he'd win Senior Combat this year, and he did. Bernie's flying talents became more effective when he switched from a diamond airfoil ship to his original Motivator II, which motivates close to 120 mph with a sleeve-bearing Tigre-felter for power. This custom-built engine, a modification of the Supertigre 35C, is now available from John Gladfelter, 611 Hilltop Lane, Cincinnati, Ohio 45215.

Bob Baldus of Des Moines, Iowa broke his ankle in two places at the Nats Tuesday.

Taking seconds in Senior and Junior Combat at '71 Nats were David and Philip Bush, flying original Dinosaur.



but flew in Open Combat on Thursday and scored a kill—crutch and all.

Engine Report: Speed men Roselle and Frye are working on a Schnuerle-port combat engine that will sell for about \$40 per copy. For information, write to RAF, 217 Wenger Rd., Englewood, Ohio 45322.

Supertanks: Tony and Joe Mickel of Chicago use a double-thickness pen bladder fuel tank for reliability and consistency. The Mickel tank is made by putting the inner bladder over a swizzle stick, pulling a slightly fatter bladder down over the first one, and then binding the inner bladder to the fuel tubing with copper wire or carpet thread. Sizes aren't critical, but look for bladders about 5/16" and 3/8" in diameter, both about 3" long. Pen bladders can be found in some pen or stationery shops and shouldn't cost more than five cents each.

I've been using these tanks for about a year and they are a great improvement over the single bladder. The double tank eliminates the problem of a change in needle valve setting from ground to flight and provides a constant fuel flow through maneuvers. It is stronger than a baby pacifier. Incidentally, if a pen bladder tank doesn't break during the first two or three runs, it will probably last a long time, so don't retire an old tank if it's still working.

JOHN SMITH SPEED AND RACING

NATS Notes: This year at the Nats was great—over 1600 contestants, with the biggest turnout in Speed and Goodyear in years. Half-A Day saw us process a fantastic 140 Proto and Speed models. There were more than 75 in A, B and C; Jet had a whopping number of honkers. The rumored times in C failed to materialize as the weather—generally bad, with 55 degrees on Wednesday—and the lack of running time on the new Wisniewski-Clary 60's kept the times low. However, a number of filers were in the 180-plus mph area, and all the excitement of a good Nats was present.

Many still can't figure out the rule book—found one contestant still using the old "T" end on his mono-line and a couple still thought they could fly on braided lines. The whippers were out in force early in the week—some still think the shortest and fastest way around the circle is with the hand twenty degrees ahead of the model. Over 115 Goodyear filers showed up, keeping the officials busy.

The Hard Luck Award Of The Week goes to Bill Keller, Dayton, Ohio, in the Rat Race circle. Seems Bill rolled a ring on his new R.A.F. (Roselle and Frye) engine at home just before the Nats. Jack Frye built him a new piston before he left for Chicago and Bill spent Monday and Tuesday at the Nats getting the new sleeve chromed and honed. Everything was "GO" Tuesday evening, but while turning in the low 12's in test flight, his up line broke. Instant kit!

This year also saw the first presentation of a CL Speed award—the First Annual Tin Ear Award. This trophy, a large tin kitchen funnel lettered for the occasion, was presented to the contestant showing the most consistent talent for getting bad needle valve settings. The lucky (?) winner was Big George Brown, of Staten Island, N.Y.

Navy Timers Do Excellent Job: The Navy help this year was top notch, with no missed times. The guys on one circle were within a tenth of each other all week long. When you consider they were "green," this performance was nothing short of great. The Navy Public Works gang also must be commended. They built new pylons on Monday when the old ones "disappeared," and were on the circle in

less than five minutes after being called to do a repair job (when the adjusting bolt thread stripped out of one pylon). All in all, it was a great week.

FAI Team Finals: Our next U.S. FAI Team should literally be a world beater. Help support the team—FAI patches and decals are available from AMA.

RADIO CONTROL

DON LOWE
SPORT AND PATTERN

Feedback: For those seeking greater flying challenge I described a technique for performing the Lomcovak maneuver in the August 1971 issue. Patrick Potega, Editor of the "Marc Sparks" (Madison, Wisconsin) Newsletter, dropped a line to describe additional techniques.

"Apparently every plane does it differently—some with controls crossed, others with control deflections in the same direction. For example, the manual that comes with the Top Flite RC Nobler describes the maneuver as follows.

"Lomcovak: Nobler does it, but it takes timing. Enter from climbing flight (or left) turn at 90 degrees climb and bank. Use full throttle throughout. While climbing make left (or right) aileron/rudder/up-elevator snap roll so that the plane is spinning and still going up. After one good spin move elevator stick to down position while maintaining rudder and aileron directions. Plane will begin to tumble a moment later. . . . After tumbling, which is the desired maneuver, release the sticks and recover. If the stick positions are held, the model will exit the tumble in an inverted spin."

"The Nobler does the maneuver well that you get a queasy feeling in the stomach just watching it gyrate. Quoting further, this time from *Air Racing* ■ *Aerobatics* 1970, James Gilbert states:

"There are various methods of entry, but basically, you begin with the airplane going upward. . . at which point you apply forward stick as if to begin an outside loop. Then you add to this. . . full left aileron and full right rudder, to initiate an outside snap, and you hold it there ■ you embark ■ the wildest

Seen at DC/RC East Coast Championships, this brake was different, simple and effective.



ride of your aeronautical lifetime. At first, the nose will track around the horizon, while the airplane hovers; then, the axis of rotation changes and the airplane will begin to tumble end-over-end, rotating forward about the axis of the wings."

"This article also illustrates ■ maneuver, for those who have doubts as to what the plane should be doing. I have done the Lomcovak with not only the RC Nobler, but also with a Taurus and a Trainermaster; each plane requires a different stick sequence and different timing. A lot of control deflection and persistence for hitting the right combination of controls seems essential for success. Once you've mastered the Lomcovak, you'll find it a real crowd-pleaser."

I must admit that I've never performed what I would call a true Lomcovak or tumble maneuver although I've tried it with several ships. Now, if we would just add it to the Class C ■ D maneuver schedule!



Members Tri-Valley RC Club, South Bend, have these ships, one on floats, for snow flying.

Safety Reminder: This tip might save you an airplane sometime. I'm sure that a lot of old-timers are aware of the necessity for checking electrical connectors ■ the airborne equipment, but it bears repeating for the new-■ and for the oldsters that tend to get careless. It's smart maintenance procedure to occasionally check the electrical connectors for tightness to insure good electrical continuity. This is particularly important for the aileron or battery connectors which ■ plugged in and out quite often, for even the best connectors tend to loosen over a period of time with use. Check these connectors that are not disturbed in normal operation upon installation and upon any occasion you may have to disconnect and reconnect. It is important to check each individual pin separately. A connector may appear tight but have a loose individual pin—and that's all it takes.

Over the years I've noted many instances of loose pins in my own and other equipment—in fact, I think that is what caused my latest bash. Tightening is a simple process of wedging a straight pin in the pin socket and bending the socket halves together. After bending recheck to ■ snug fit.

Club FCC Licensing: The club FCC license is being employed by many clubs. It saves the individual a lot of money and the FCC likes it since it indicates the organized nature of RC modeling. Each club, however, must designate the limits, if any, imposed on its use by members. Clubs have placed varying restrictions, apparently ■ a function of their officers' willingness to accept responsibility for individual member's use of the privilege. The DC/RC Club of Washington D.C., for example, imposes the following restrictions as noted in their July Newsletter:

The club license is available only to (1) all juniors and (2) all new members for one year from date of joining the DC/RC and (3) any DC/RC member for six months after expiration of his individual FCC license. Further, the license will be valid only at DC/RC Club fields and events. Club members are enjoined by DC/RC to exercise care in the use of the license since error by one member can jeopardize the privilege for all. The club basically feels that all members should have individual licenses but is providing for financially burdened juniors and other temporary situations.

Retracts Revisited: Retracts are getting better as evidenced by some of the new products by

Pro-Line, Kraft and others. A cry comes from the "Oily Birds" June '71 "Squack Sheet" Newsletter for a ideal set after much difficulty, as well as concern about cost and complexity, with existing brands. The criteria established is as follows: (1) Three wheels, one steerable; (2) Light weight—maximum of 1½ oz. extra weight per wheel; (3) No additional equipment required other than perhaps a switch—no extra servos, no extra batteries, no linkage to install; (4) Must be operable from any brand of radio having a fifth channel; (5) Must be strong enough to withstand bashes without damage; (6) Must cost no more than \$25.00 for all units complete.

This may sound like a tough set of requirements but this hobby industry is ingenious. After accomplishing the development of sophisticated proportional equipment on a shoestring budget and with prices on some going down every year, the challenge of super-retracts doesn't sound so difficult, does it? How about another challenge—mufflers with no power loss, ■ maximum of 90 DB sound level at 20 ft. range, weighing not over 2 ounces for a 60 engine size and most importantly does not fall off the airplane or fail from vibration fatigue. It can be done with careful engineering and testing.

Groovy Motor Mount: Mike Donovan of Vicksburg, Miss. forwards an idea for a motor mount improvement. If you've had trouble with loosening of engines on hardwood mounts, it is primarily due to the wood compressing and deforming over a period of time. Retightening is only a temporary solution. What is needed is to spread the load out over a larger area. Mike does this by bolting ¼" aluminum plates to the beams, drilling and tapping for the engine mounting screws. The Pilot ARF "Five Star" (distributed by World Engines) I have been flying employs this technique and so far it's as tight as can be.

Contest Report: From Pensacola, Florida comes news of the "Fiesta of Five Flags" RC Championships held June 12-13, 1971. The high point trophy was won by Art Azlin of Huntsville, Ala., with firsts in Scale, Pylon and Class D Novice. Understand he put on quite a realistic performance with his scale P-38 Lightning. (I have always had a thing for the P-38—such a beautiful bird.) Jim Kirkland of Valparaiso, Florida, took first in D Expert with his reduced scale Little Citron. Jim has his own design small scale retracts in this 40-size ship. Steve Hackney of Pensacola, Florida took Class ■ honors and Russ Spencer of Tallahassee, was Class A winner.

CLAUDE McCULLOUGH SCALE

Rest In Pieces: The crack-up attrition rate in RC Scale at the 71 Nats was much higher than usual and the results of hundreds of hours of beautiful craftsmanship were left scattered on the ground. In most cases some variation of the classic scale stall followed by a snap roll occurred—generally immediately after take-off. The sickening "stomped orange crate" sound of the impacts emphasized once again there ■ limits to which wing loadings can be carried with safety. Even more certain is the necessity for adequate engine displacement operating at peak efficiency. Too much power for scale-like flight can easily be handled by pulling back on the throttle, but on the take-off run of a heavily laden or drag-handicapped model there is hardly such a thing as over-powering.

Simple Solution?: The flying troubles of elaborate models and the high scale scores awarded to well-done versions of relatively uncomplicated subjects were not lost on scale enthusiasts at Glenview. Talk in the pits for future subject choices was of homebuilt and older types with a minimum of frills. Arguments before the Scale Contest Board meeting that this was a trend that would stifle variety, and the proposal that a difficulty score should

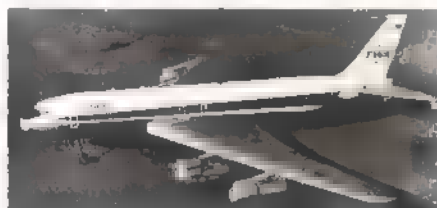


Cockpit of John Roth's Ross Twin powered Volksplane. Placed third in Nats, won spot on 1972 Scale team. Simple model can do well.

be given as an encouragement for models with features requiring extra work, were rejected for the second year in a row. So, simplicity may be a trend.

Factor No Factor: Despite use of FAI rules featuring a Complexity "K" factor award in each judging category, non-complex types captured the top places in this year's British Nationals RC Scale Event. Lunt's winning Chilton is a resolutely Plain Jane-looking design but, like Butcher's Fokker D-8 (second) and Terry Melleney's Moth Minor (third), it is an excellent flight score producer. It would appear that fears of the Complexity Factor eliminating simple types are premature at best.

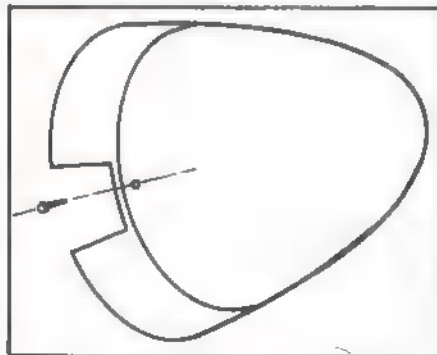
Boeing Bo-ing: Paul Martin's fine performing 707 at the Nats was aided by a clever flap-actuating system that will prove useful for other similar design problems. Knowing that the flap segments staggered along the swept wing would have undesirable play if conventional ballcrank hookups were used to interconnect them, he developed a one-piece bowed torque rod made from a length of 3/32" spring steel wire. Hold the wire at each end and arch it into a natural curve, using nylon bearings at the wing roots, at the ends



Two ST 60's power Paul Martin's Boeing 707. Has 75 1/2-in. span, weighs 15 lbs. Martin built his own pneumatic retract gear.

and at each soldered-on flap horn, to hold it in the degree of curvature selected. Start with a perfectly straight piece of wire; it will not wobble when rotated and be careful not to bow it far enough to bend it. Paul's final touch was a slowed-down worm gear drive

Fig. 1. Self-tapping screws prevent spinner loss.



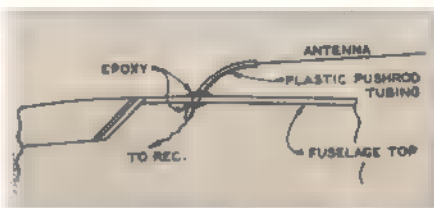
from the servo so that the flaps come down at scale speed.

Top-Flite P-51: This kit is ideal for the new stand-off judging Sport Scale Event, accepted for the AMA rule book by the Scale Contest Board at Glenview during their annual meeting. Builders should note that an error appears on the P-51 plans. In sketch 13 the alignment wedge is shown reversed, giving a wing built in this manner an incorrect 10 degrees of wash-out. The narrow end of the wedge should be located at the wing tip, the wide end at the root. The P-51 will soon be joined by a companion kit, the Curtiss P-40.

HOWARD McENTEE FAI AND GLIDERS

Nats Glider Meet: Unfortunately unofficial, but better attended than many official Nats events, the Nats Glider Meet was held at "Miller Meadow," a huge flat field of close-cut grass furnished by Cook Co. Forest Preserve. Fifty-four contestants entered 67 gliders in the meet, sponsored by S.O.A.R. and CDED by Dave Burt, who, along with Dan Pruss, started the whole idea in 1970. Spot landing points were awarded, but the "spot" was a 25 x 150' rectangle facing into the wind. Plenty of winches on hand for launching.

As last year, two events were flown: one for gliders to FAI specs; the other for those with 100" span or less. Top winners in 100" Class: 1. R. Smith (H.S.S. Club, Calif., Windward glider); 2. J. Nielsen (SOAR, Ill., Phoenix with short wings); 3. M. Smith (no info). FAI winners: 1. J. Nielsen (Phoenix 130); 2. C. Carlson (SOAR, Ill., Plain No. 1); 3. O. Helthecker (G.D.S. H.S., Mich., Snoopy). Latter three will form team for informal glider competition at Fall RC World Champs. This is a most interesting affair, it is about the only glider meet that brings together fliers from every section of the country.



Simple Antenna Attachment: Sketch shows system used by Bob Lopshire to bring antenna out of fuse. You would probably still want rubber band "shock absorber" at back end of antenna—also a knot in the wire to keep antenna from pulling through plastic tubing.

Airfoil Data Wanted: Jack Burns likes to tackle model glider problems the scientific way, and has plotted model glider performance for several common airfoils, including that on the LII T (his first RC glider), the Clark Y and the NACA 6712. He is most anxious to obtain data on the Epple E-385 and similar undercambered types. Write him at 827 S. East Ave., Oak Park, Ill. 60304.

More Stability: Note in the "Airfoiler" (Tutahoma, Tenn.), says that addition of 3" to each stab tip of the Sterling Schweizer 1-26 glider makes a big improvement in stability and flying characteristics. Elevators were left original size, addition was made just to stab tips. This suggestion by Lee Webster.

Windspiel Aileron Linkage: In August 1971 AAM, we had notes on difficulties encountered by several fliers with aileron linkage (from fuselage to wings) of this German kit glider. They were unable to keep the "universal joint" couplings tight enough. A recent letter from C. W. Hartzitz of Rowan (makers

of the kit) notes that they have had no such problems in the three years the Windspiel has been in use. It is suggested that the wing halves be fastened together by rubber bands or a spring through the fuselage, per the plans. If the aileron linkage clips are not tight enough, they can be reinforced by slipping a small piece of fuel tubing over the clips (as done on control surface clevises). Hartzitz feels that flying without ailerons is a severe handicap to this glider. He notes that he has recently won the 1971 German Nats Thermal Soaring event with a Windspiel built according to the plans.

Active New Club: The Tidewater Model Soaring Society has already held several meets. Thermal meets were at Hampton, Virginia; Slope meet was held at the huge dunes around Nags Head, North Carolina. More meets are planned. Group has held the first open slope soaring meets at the East Coast; their biggest effort of the year will be a Nags Head Slope meet on Oct. 3. CD is Paul Byrum (242 Beauregard Hts., Hampton, Va. 23369).

BOB STOCKWELL PYLON RACING

Rules Vote: I'll not go over the Nats results here, since you saw them in the general coverage last month in AAM and in other model publications. There was, however, a major rules controversy at the Nats which you may not have heard about. As it will be decided by a mail vote of the RC Contest Board during the winter, this is an issue which you can still make an impact if you want to write a letter to your district's CB member.

It all started with the NMPRA Opinion Poll last winter in RC News. One proposal was that engines should be stock as defined in existing rules, except that one would be free to remove any parts or material (without changing displacement); nothing, it was proposed, could be added or replaced with other than stock parts. Thus all engines would be stock, or customized only by "cleaning them up." The proposal was accompanied by a separate provision for inspection of engines upon posting of a \$25.00 forfeiture bond—so that the guy whose engine was protested would, if legal, get the bond for his trouble.

These proposals received broad support, but were vigorously opposed by Vern Smith who presented eloquent arguments, based on his years of experience in automotive racing, that the only enforceable rule is one which (a) specifies displacement, and (b) requires that the engine appear stock upon external examination.

At the CB meeting, Bror Faber presented the NMPRA position, and Vern Smith presented his own. A straw vote was taken, and the results indicated wide support of Smith's proposal. An official vote will be taken by mail (unless, may happen, there is moratorium on all rule changes while the AMA updates the rule book).

Personally, I find the CB vote quite surprising. It is important to call attention to the fact that the only American engine manufacturer with a substantial financial investment in producing good engines for racing is K & B. I do not think we would be well-advised to go lightly against the strongly-held view of Johnny Brodbeck, Jr., that the Vern Smith proposal would be very damaging to the manufacture of good, cheap, readily-available racing engines. A rule does not need to be enforceable in a strict police-state sense; modelers are, with mighty few exceptions, men of integrity who are not going to violate a rule even if they know the average CD probably cannot prove they have violated it.

In short, even though I realize fully the advantages of Vern Smith's proposal with respect to enforceability, I think that the opportunities it would give to the engine specialists, and the potential it has for enormously hiking the cost of being competitive, make it most undesirable.



Bob Violet, Cliff Telford, FAI Nats winners, with Supertigre P-51—PB Products fuselage, own wing, Bonetti retracts, homemade muffler.

FAI At The Nats: How did FAI work out this year? One thing was painfully clear—unless you're a first-class engine expert (as Cliff Telford is), you may well forget it. As Bob Violet and Cliff Telford pointed out with some measure of irritation, the doors of engine modification (even machining from scratch) are absolutely wide open (except for displacement) in FAI. That means the cost of these birds can go up, and up, and up. They figure their Nats winner was worth about \$850.00—had a \$35.00 engine in it, not counting Cliff's labor. Retractable gear, with the additional servo, are part of the extra cost, but the engine/muffler combination is potentially a hair-raiser. When you can fly loose and still easily defeat Bob Smith, as they did in the fly-off for first place FAI, you speak with real authority, and the powers who made the rules would do well to listen. Part of their advantage was their efficient homemade muffler. It beat most of the commercial mufflers by at least three decibels, yet their time was fastest by five sec. and could have been even faster if pushed.

One has to wonder if the flavor of international competition is so pleasurable that we should live with such a wide-open event as FAI with respect to engines and retractable gear. But since we must compete internationally, we need to do something dramatic about changing the FAI rules to eliminate these problems (including the strange flagging system that Nats executives wisely ignored). The FAI course, however, is a good idea—wider between pylons two and three—and probably should be adopted for Formula I and II.

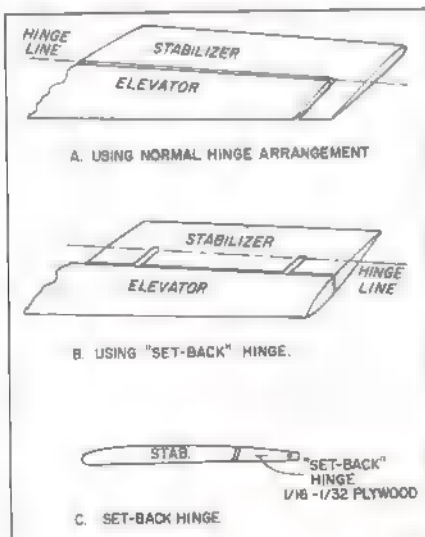


Diagram missing from Fred Mark's November Column.

special interest

FRED MARKS
AERODYNAMICS, ELECTRONICS

The All-American Digital System: Occasionally a question is received asking which system (of the many which receive Blue Ribbon Reviews) is considered the best. The answer must inevitably be that there is no "best" system. Certain features are a matter of personal preference, and what one modeler likes someone else probably will not. Furthermore, there are specific features of some systems that generate a lot of interest.

However, it is interesting to consider the combination of features which might make up what could be called the "All-American" system, if one were starting a complete system design from scratch. Starting at the transmitter, use an external transformer isolated fuse protected charger with a fast charge dual output so that either pack may be charged independently and with separate indication for each. The reason? It can then be used to charge other batteries. The transmitter case could be styled and well-balanced, as is done for the MRC F710 system, but should be vinyl-covered so that it isn't cold to touch in winter. Stick assemblies are a compromise—open gimbals impart a better feel and more precise centering, but permit dirt to enter the case. So, a well-designed, closed stick gets the nod. The EK assembly with the small, easily-replaced ceramic pot element offers a convenient arrangement.

The encoder should utilize integrated circuit one-shot multivibrators to minimize parts count (one IC with two pots and two capacitors forms two channels). However, these IC's are yet too expensive at around \$10 each. A buddy system is a nicety which can contribute to reliability problems unless carefully designed and used. An RF section should be used which utilizes a stable, broad oscillator that can accommodate changeable crystals for at least three adjacent frequencies without retuning. An active antenna system, a new concept, is desirable to reduce antenna length to a few inches instead of feet. That will have to wait.

The crystal filter receiver used by Heathkit seems ideally to reduce parts count and tuning. Application of integrated circuit IF strips and front ends to receivers is still not practical, but give it time. Certainly, the application of IC inverters and gates can be used effectively for squaring and pulse stretching of clock and synchronization pulses for the decoder. The decoder would utilize a low-drain, high-reliability integrated circuit shift register or multiple J-K flip-flops. The plug and wiring harness which I find appealing is used by Larson; all the wires are routed to a pc terminal block mounted to the back of the switch. Thus, there are no heavy individual bundles of leads to any one component. The wiring flows naturally to each component and nothing is wadded up. A plug block is almost equally good. Individual components (servos, receiver) are preferred over a brick because of the effect of the impact in a crash.

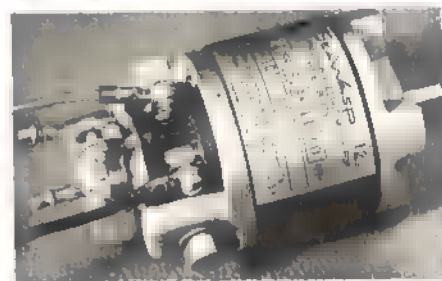
The servo should ideally have the flexibility of dual outputs, i.e., both rack and rotary even at the expense of size. The servo should incorporate a sufficiently inexpensive "throwaway" IC amplifier that can be replaced by the modeler at less than the cost of repairs to a discrete component amplifier; less than \$10 is a good goal.

Finally, there are the batteries about which, it seems, almost nothing can be done.

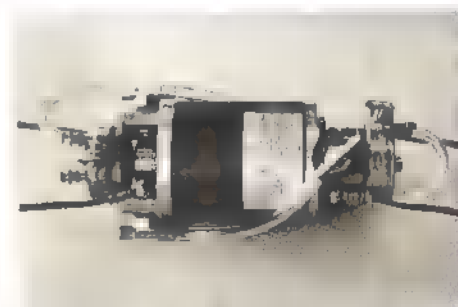
They continue to be the major cause of failures. Perhaps the only sure (but expensive) solution is to have a charger which will discharge and check the cells, warn of weakness, if any, and then quick-charge them. Certainly, the spot-welded metal strap intercell connectors should be eliminated in favor of flexible, soft multistrand intercell wiring, soldered to a carefully welded tab and not the cell. There are enough system manufacturers to develop a joint specification and procure, centrally if necessary, what is needed. Remember, people can be hurt badly by a battery failure. An industry that procures an estimated 125,000 cells per year should be able to demand something better.

CLIFF PETERS
RC BOATING

RC Model Boat Club: Originally a U-Control flying club, the Greater Hartford (Connecticut) Model Club took the unusual path into RC model boat racing, and now the flying portion has all but disappeared with a regular schedule of model boat racing having taken its place. Now boasting a membership of 18, the majority of its members are chasing hydros around the marker buoys on weekends and Wednesday evenings after work. Although hydros predominate, there are members who prefer sail, and some even electric. Enjoying the privileges granted by the U.S. Army which control of all inland waterways, they have a huge lake in the Mansfield Dam area which is absolutely private—in fact, so private and removed from any nearby residents that mufflers are not even considered. It is about as close to a boater's paradise as possible. A locked gate, to which the members have been given the combination, makes possible those periodic cookouts in which all the families participate. The area is shared with the RC model aircraft hobbyists—a schedule that eliminates frequency mix-ups. This is a live-wire Club and is growing fast.



Kroker's SeaWasp 12, draws only 5.3 amps for 11,000 rpm. is ideal for monoplanes, scale. Holds World C record.



Kroker SeaRam showing plastic tubing to carry cooling water to bearings, brush caps. At 17,500 rpm, develops 3/8 hp.

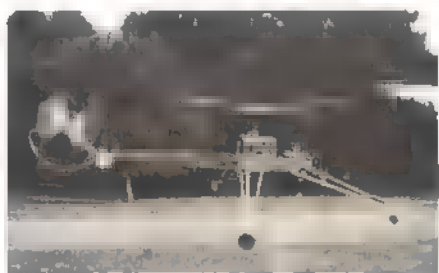
More On Starter Motors: An additional note for those planning to use starter motor mentioned in last month's column—when starting the engine on land, set the throttle on low. If throttle is left partially open, the engine,

not having a load, will run wild. (A flywheel is not a load except during acceleration.)

A starter motor is an ideal purchase for a money-saving group or boat club, as each member has only to obtain an inexpensive "O" ring in order to use it.

JOHN BURKAM HELICOPTERS

Successful Helicopterite: Gene Rock of Media, Pennsylvania has just flown his machine for the first time, reaching altitudes of 15 feet several times. Gene, who has been building all types of helicopters for at least seven years, finally achieved RC success with his 55-in., six-lb. model powered by a well-muffled Enya 45. Power transmission to main



Rock's 'copter flew last August. Enya turns 55-in. rotor. The tail rotor is driven by 40 D.P. timing belts.

and tail rotors is entirely by timing belts with a centrifugal clutch on intermediate shaft. The Hiller-type rotor gives excellent stability and good control. Gene decided to forego tethered practice on his latest machine since its landing gear spread is greater than the rotor diameter. By late afternoon, after a collision with a tree, an inverted landing, and minor repairs, he was showing much better control over it. Congratulations, Gene!



Eugene Rock's helicopter has a timing belt transmission with 14-to-1 reduction ratio to main rotor. Weight: 6 lb.

More About Hiller Rotor: The collective pitch of the Hiller-type rotor, whose sketch was shown in last month's column (five degrees to the flat bottom of the airfoil) gives fairly good lifting efficiency, but will not permit autorotation even if the transmission has an overrunning clutch. Dieter Schluter uses about half that much collective pitch and his model autorotates as long as forward speed is maintained. However, in powered flight, his rotor gives only about half as much thrust per horsepower and turns at twice the rpm.

Hiller Rotor Stability: The heavy servo rotor paddles act as a gyro bar and tend to remain in a given plane of rotation. The cyclic pitch of the main rotor blades is controlled directly by the servo rotor and the main rotor responds more to the servo rotor attitude than to other influences (such as gusts or helicopter motion). However, tilting of the rotor shaft while controls are held fixed puts a cyclic pitch (angle varies sinusoidally as rotor turns) into the servo paddles which does tend



Flown in demonstrations, Morace Hagen's 'copter is capable of sustained hovering; translation for several minutes.

to make the servo rotor follow shaft tilt—but slowly. Thus the main rotor tip path plane also tilts slowly, following the servo rotor. The thrust vector or line of action of the main rotor thrust is perpendicular to its plane of rotation and is said to lag the fuselage or shaft tilt. This lagging thrust vector tends to damp out or retard the swinging motion of the fuselage because it is always tilted the opposite direction to the swinging motion of the fuselage. Control of the Hiller rotor is obtained by tilting the swash plate, which puts cyclic pitch into the servo paddles.

DEFINITIONS FOR THE HELICOPTERITE:

Collective pitch—average angle of the rotor blades.

Autorotation—rotor is kept turning only by air flowing through it.

Overrunning clutch—a clutch which does not slip when the engine drives the rotor, but slips easily when the engine stops and the rotor keeps going (autorotating).

Cyclic pitch—angle through which blade changes as it makes one revolution.

Servo rotor—cross bar perpendicular to main rotor blades has paddles on each end. Cyclic pitch imposed on these paddles gets amplified by air forces acting on them, giving larger force to control cyclic pitch of main blades.

Tip path plane—plane in which the rotor blade tips rotate.

Swash plate—large ball bearing encircling the rotor shaft. One race does not rotate but is tilted by pushrods from the radio servos; the other race rotates with the rotor and is connected by pushrods to the main blades or to the servo paddles (in the case of the Hiller rotor).

Lagging thrust vector—the line of action of rotor thrust tilts the direction as the shaft tilts but a little later in time.

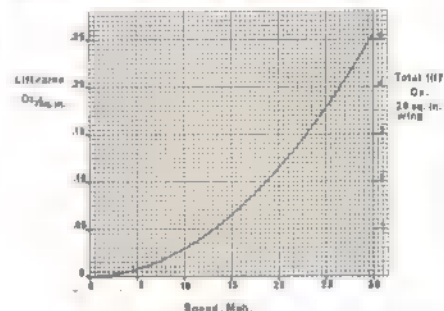
LARRY ROBBINS RC CAR RACING

Wings: The following, "The Ways of Wings," is an article on wings and the down forces they generate by Don Stauffer, of Florissant, Missouri. Any comments on this highly-controversial subject will be appreciated.

Do wings work on model cars? Do they really improve handling? Why not? But the laws of aerodynamics operate on true speed rather than scale speed. Far-flung opinions range from the idea that wings are the panacea for all handling problems, to doubts that wings have any effect other than appearance. But the laws of physics are not black magic. It is time to take a rational look at just how much force a model car wing can produce.

The force on a model wing can be calculated by the same equation of aerodynamics that predicts the lift force on an airplane wing. I will continue to use the term lift, for the sake of our aerodynamicist friends, even though the model car wing produces a downward push. The lifting force for each unit of wing area is given by the equation: L/A is equal to $\frac{1}{2} C_L V^2$, where C_L is the lift coefficient, ρ measure of the efficiency of the wing, r is density of air,

and V is the speed in miles per hour. A good high lift airfoil set at its optimum incidence angle should be able to achieve a lift coefficient of one or slightly more. The density of air can be found in standard tables (.00238 slugs/ft³). Although this equation is easy to solve and plot, I turned the job over to a Hewlett-Packard 9100 computer and plotter, just for the fun of it. The graph drawn by the computer shows the lift-per-unit area for any given speed up to 30 mph. Also shown on the same graph is the total lift on a wing with twenty sq. in. of area—this is a reasonable size for a model car (10 x 2" for instance).



As you can see, the force does become appreciable at higher speeds. The lift at 30 mph increases the downward force on the rear tires by about 10%. In a sense, this force is free. If we try to increase traction by adding weights, it is usually used up fighting the increased centrifugal force. The wing generally produces no side force, so the full down force is utilized to improve the handling. However, notice that the down force is very low at the lower speeds, as in a slow corner. Yet many drivers, after fitting wings, report a handling improvement in slow corners, especially during acceleration. This effect could be due to weight transfer.

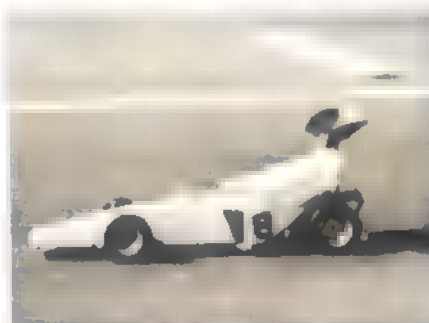
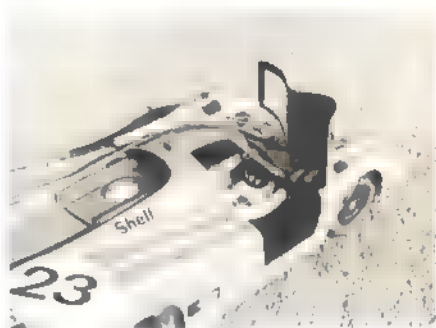
Many of these wings are heavy, being metal, or having a metal support, and this weight should not be ignored. It is not my intention to cover the physics of weight transfer in detail, but an example may be useful. Consider a car with the wing four in. above the center of gravity (CG). Further, assume the car CG is four in. ahead of the rear axle. Under maximum acceleration the inertial (weight transfer) forces can create an additional down force on the rear wheels nearly equal to the weight of the wing. Referring to the graph, we see that for one ounce wing, these inertial forces would predominate below about 13 mph. The aerodynamic forces would be more effective above that speed. Unfortunately, the inertial forces reverse under braking, and unload the rear wheels, tending to induce oversteer. So go easy on hanging a lot of weight up high.

The angle the wing should be set at is a compromise. As the angle is increased, more lift is produced—but the drag also increases. There will be an angle where the ratio of lift to drag is a maximum, however this will be a smaller angle than the one where maximum lift is produced. The increased drag at the higher angles may be detrimental on a high-speed course, especially when running high-speed gears. So you have a choice. Run at the angle for maximum lift over drag if the loss of speed from drag is important. If handling is more important than top speed, the incidence angle can be increased to almost the stall angle, about 15 degrees for most airfoils. I have wings mounted with as much as a 30 degree angle, and wonder about their effectiveness. It would be nice to get some of our cars into wind tunnels and actually make measurements.

In summary, it is evident that appreciable forces can be created by a wing. But five oz. or so of down force will not make a Series 71 winner out of a dog in the hands of a poor driver. However, for a good-handling car, controlled by a good driver, a wing can produce the extra margin of handling needed in close competition.

THE ROAR NATS

by WENDEL GREEN



Bill Miller's immaculate and raceable Porsche 917 is the Concourse winner. Car has details suggesting real car's frame, lights, etc.

Ken Stevens' car takes the high road, while Rosengren's takes the low road. They just kept on racing.

Flanked by Miss Rev-Up and Miss ROAR, are (l to r) Schreindl, Chan, Rosengren, Thorpe and Campbell. These drivers were the main event road course finalists.

John Thorpe's car in road course finals.

Chris Chan, at left, with modified Orbit and John Thorpe with modified MCE. Note—both prefer pistol-grip throttle system.

The Associated crew's pit, lots of cars and much effort. Plenty of consistent racing, too.

Three thousand seven hundred 1-1 scale miles, driven by 1/8 scale RC cars in perfect weather on a long, challenging course, summarizes the scene at the 1971 ROAR Nationals held at Langley High School in Virginia, July 2, 3 and 4, 1971.

The last minute change of site caused some delay in getting started on Friday and the early arrivals found themselves being drafted to lay down course-marker tape and set the loudspeaker and tables up, in addition to getting ready to run. Everybody that was there that day got in at least one practice session (ten minutes on both the road course and the oval course).

The entrants soon found that the long road course with its downhill, sweeping straight was one that demanded skill, as well as a fast car with good brakes. By track closing time Friday night, it was obvious that the overall winner in this event was going to be the driver capable of maintaining a

consistently fast lap time on both the road and the oval course.

The contest director managed to get the schedule rearranged Saturday morning, and, as soon as those people who had not yet practiced got their practice sessions, qualification began. Qualification heats were ten laps in duration and qualifying was based on the fastest average lap times. Each entrant got one qualifying heat on the road course and one on the oval course.

There was some real blood and guts racing during these qualifying heats. One outstanding ten-lap duel during oval qualifying involved Mike Morrissey and Peter vonAhrens. At the finish, these two cars were literally in contact nose to tail. After the oval qualifying on Saturday, those drivers who elected to sign up for a second qualifying attempt on Sunday morning voided their Saturday qualifying times. Likewise, at the end of the road qualifying on Saturday, some

drivers elected to try again on Sunday.

On Sunday morning at seven a.m., the second qualifying attempts were made on the oval course. At the end of qualifying, Bob Emott was the fastest, with an average lap time of 11.68 sec. for ten laps, followed by Rodger Curtis, 12.01 sec., Ike Hills, 12.04 sec., Mike Morrissey, also 12.04 sec., and Peter vonAhrens, 12.05 sec.

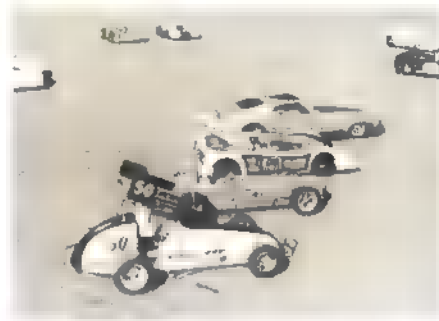
Each driver was timed and lap counts were made during the heats. The race was over when the first car completed ten laps and each car's time was stopped the next time he crossed the finish line after the winner. The time for each car was divided by the number of laps that car completed to arrive at the average lap times, which were the basis for qualifying and elimination.

After the road course qualifying, the fastest time was posted by Earl Campbell, 18.10 sec. average lap time for ten laps, followed by Rodger Curtis, 18.39 sec., Dell

With a long challenging course for road and oval racing, well-prepared competitors made this the fastest and best car Nats yet.



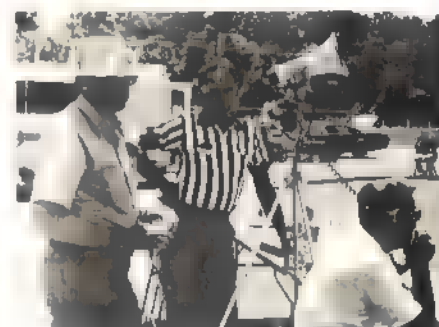
This gives an idea of the size and shape of the road course. The oval is upper part of track where photographer is standing.



These magnificent cars, entered in various events, show the variety of 1/8 scale RC racing.



Start of an oval course elimination heat.



CD of 1971 ROAR Nats, Wendel Green (at left), starter, Jim Dicky, and Monitor Bob Stevens at the mike.

Not sure what he's saying, but Ike Hills is working out some detail on his fast MCE.



View of the oval course in action from behind officials' tables. Notice the track slopes and the length of the long road course straight.



Fisher, 18.40 sec., and John Thorpe, 18.45 sec. The top twenty-five qualifiers were then placed in ten lap elimination heats on both the road course and the oval course.

The main event on the oval course had to be split into two thirty-five lap races because of frequency conflicts, and when it was all over the National Oval Champion was Rodger Curtis, completing thirty-five laps in 6 min., 32.10 sec.; Bob Emott was second, Dell Fisher was third; John Thorpe, fourth; Ike Hills, fifth; and Peter vonAhrens, sixth.

The top five from the road course elimination presented no frequency conflicts, therefore the main event on the road course was a 50 lap race. The outcome of that event was Chris Chan, National Road Racing Champion, and on the same lap right behind him was Bud Schreindl, followed by Earl Campbell, completing 48 laps, John Thorpe, with 45 laps, and Rolf Rosengren, 34 laps.

The drag race event was run on the

sudden-death elimination basis, each driver going head-to-head with another driver and the winner advancing into the next round. This proved to be quite a spectacular event—a few of the cars, because of their great speed, managed to get out of radio range before they were stopped. The sight of Mike Morrissey's Associated going into a chain-link fence at full speed is a sight that the manufacturers of the low-powered radios should have seen. When it was all over, the 19-powered MCE dragster of L. Sabato proved to be the fastest in the 19 class drags.

The concourse winner was Miller's beautifully-prepared Porsche 917. It has to be seen to be believed! No photograph can possibly do justice to the detail and overall effect of this car. The cars' general level of detail at the Nationals showed what this 1/8 scale RC racing can really be like.

The Grand National Champion was determined by adding qualification points on

both the road course and the oval course, the elimination heat points on the road course and those on the oval course, the points for finishing position in the main event oval and in the main event road course, the engineering points and, finally, the concourse points. When all of this was added up, the first four places went to: John Thorpe, 105 points; Rodger Curtis, 101 points; Bud Schreindl, 97 points; and Dell Fisher, 94 points. It must be noted that the 1971 Grand National Champion, John Thorpe, was the only driver to qualify for both main events.

The starter was Jim Dickey of the Washington RC Racing Association; the contest director was Wendel Green, President of the Washington RC Racing Association; the PA voice was Bob Stevens; chief sponsor, American Aircraft Modeler. Without the cooperation of Langley High School, Langley, Virginia and the Fairfax County Police force, the event would not have been possible.

RC World Championships

by DON LOWE



Photos by Don Lowe, Chuck Shade, Carl Whealey, and Phil Edwards



GOOD WEATHER GREETED 60 FLIERS FROM 22 COUNTRIES FOR THE FIRST CHAMPIONSHIPS HELD IN AMERICA.

Doylestown, Pennsylvania was the scene of the Seventh Aerobatic RC World Championships held September 15-19, 1971. Sixty fliers from 22 nations completed 240 flight attempts for four flights each in two and one-half days of flying.

This was the first time that the World Championships have been held in this country. It was all made possible through a unique arrangement whereby the AMA, the hobby industry and the modelers of the United States helped defray the added expenses of foreign contestants' travel here. A site was selected to permit sufficient paid public transportation. This ruled out military sites and led to the selection of Central Bucks County Airport in Doylestown.

Ten judges from ten different nations worked continuously to score approximately 3500 maneuver attempts to select the new champions of the world. Our hats are off to these flight judges who had perhaps the most thankless task of all.

Practice flying for all contestants was held under sunny skies on a controlled, 10-minutes-per-contestant basis. The weather was unique in itself since Pennsylvania had been subjected to torrential rains and flooding before the meet. Many of the contestants were not in the best condition after the long travel and early Wednesday morning arrival by bus at Doylestown. Pierre Hoffman, Luxembourg, told me that he had been awake for 52 hours up to that point! Most contestants, however, availed themselves of the

opportunity to check their craft before the formal practice rounds began on Thursday morning. Thursday dawned under an overcast sky which prevailed through the contest without raining, until after the awards ceremony on Sunday. Though dark clouds threatened and haze on Friday morning delayed the start of flying, almost optimum flying weather conditions existed throughout.

The formal practice flights Thursday were run using the contest flight order and procedures. Thursday afternoon saw the beginning of official competition. Bruno Giezendanner, the current world champ from Switzerland, charged into an early lead by posting the highest scoring flight of the meet—7075 points (5 judges total score). Phil Kraft of the USA posted 6845 points for second highest score in the first round followed by J. Wester of West Germany with 6595. The other U.S. team members—Jim Whitley and Ron Chidgey—flew well in the first round, but were flying against tougher judges and scored substantially lower. It is interesting to note that Giezendanner, Kraft and Wester all scored significantly lower on their second round when flying against the other set of judges. This supports the contention that even at the World Championships there is a wide spread in scoring. This variation can be negated only by consistent judging by each judge, consistent flying, and each contestant flying against each set of judges.

Round one was completed on Thursday

morning. Warren Hitchcox of Canada posted the only flight early Thursday morning and skirted the fringes of the overcast to do it. In fact, he practically disappeared in his "Top Hat" and "Figure M" but posted his highest score of 6000. Along about 10:30 a.m. the clouds had sufficiently lifted to resume flying. The second round saw Wolfgang Matt of Liechtenstein receive the benefit of the judges switch and some fine flying to take over first place with a flight of 6925 points and a two-round total of 12,670 points. Phil Kraft remained in second with 12,425 and Giezendanner slipped to third by posting a score of 5295 points and a total of 12,370.

In round three, the judges were mixed and scores of the leaders reflected this by falling between their first and second round scores. Hanno Prettnner of Austria was the exception, however, and made his move with a personal high score of 6515 points. The end of this round had Matt still leading with Bruno second and Kraft in third. The last round ended with Matt and Giezendanner putting in absolutely magnificent flights resulting in Bruno edging Matt for the best three-flight edge of 20,315 points to 20,275 for Matt. Phil Kraft followed with a best three-flight total of 19,455.

This reporter had a good ringside seat acting as a starter-timer along with Norm Page, Jim Grier and Rudy Black. It was a tremendous opportunity to observe and evaluate technique and design at very close range. Giezendanner's aircraft design and flying style

Team Standings

Place	Nation	Points*
1.	USA	56700
2.	SWITZERLAND	52140
3.	GERMANY	51975
4.	ENGLAND	51810
5.	AUSTRIA	51710
6.	JAPAN	51075
7.	ITALY	49515
8.	FRANCE	47595
9.	CANADA	46050
10.	BELGIUM	45025

Individual Standings

Place/Competitor/Nation	(1)	(2)	(3)	(4)	Total Best 3
1. Giezendanner, B., Switzerland	7075	5295	6455	6785	20315
2. Matt, W., Liechtenstein	5745	6925	6310	7040	20275
3. Kraft, P., USA	6845	5580	6230	6380	19455
4. Prettnner, H., Austria	6355	5735	6515	6225	19095
5. Wester, J., Germany	6595	4990	6255	6240	19090
6. Whitley, J., USA	5930	6405	5805	6415	18750
7. Chidgey, R., USA	5585	6400	5695	6400	18495
8. Schaden, F., Austria	4825	6150	6065	6010	18225
9. Sugawara, Y., Japan	6085	5110	6215	5860	18160
10. Hardaker, D., England	4960	6640	5655	5695	17990

*Sum of individual contestants scores, best three flights for each.

was an interesting contrast with that of Matt, Kraft, Prettner, Wester and others. Bruno's airplane was rather large (772 sq. in.) of conventional old-fashioned bubble canopy configuration, with a low-wing loading. With this setup he flew a slow, tight pattern with great precision. His airplane's strongest suit was looping maneuvers and his spin was a thing of beauty. If any weakness could be found it was in rolling maneuvers due to lack of speed and fuselage side area. It must be pointed out, however, that Bruno is a very polished flier and extracted everything available from his craft. His repeat win was no fluke.

In contrast, Wolfgang Matt flew a ship—more to my liking—called "Super Star." The ship had 659 sq. in. and weighed over eight

lbs. with fuel. Pulled by an HP 61F and equipped with retracts, it really moved and performed large maneuvers. Throttle was extensively used by Matt through most maneuvers to maintain constant speed. Even his turn arounds were throttled and performed with precision. The only weakness I could find in his maneuvers was the spin where he seemed to pull up and over on spin entry. I would suspect that except for this he might now be the new world's champion. Hanno Prettner flew a similar aircraft and with similar style, as did Wester of Germany.

An additional note of interest about these three concerns their transmitter. All three used a strap-suspended transmitter with extra-long control sticks. Maybe this contributed to

their extreme smoothness and lack of erratic flying. Matt's last flight was the most perfect pattern flight that I have ever witnessed, with every maneuver exactly as the book shows it and without an extraneous bobble. Jim Kirkland and I watched this one through and marveled at its precision. There is absolutely no doubt that foreign flying, equipment and technique is as good or better than our own. Most of their top fliers are young and are getting better. We will be hard-pressed to win from now on.

Without exception, fliers from the other countries used two-stick transmitters of mode one or two setup. The only single-stick transmitter at the contest was flown by Ron Chidgey of the U.S. team. The suspended



(2)



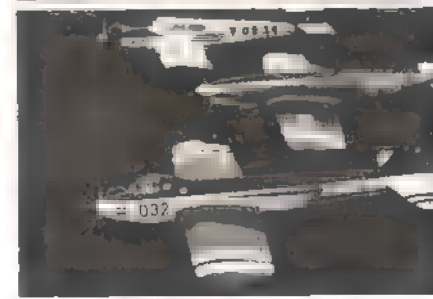
(12)



(3)



(1) Bruno Glezendanner's contestant number 13 didn't appear to have any effect. Here he lands after a practice flight. His plane is almost the same design as that of [redacted] with two years [redacted]. (2) The individual winners were Bruno Glezendanner and Wolfgang Matt, here being congratulated by AMA's John Clemens, and Phil Kraft. Flying styles of these three fliers were completely different. This uniqueness is a tribute to their skill and the judges' ability to discern precision maneuvers. (3) The American [redacted] in order of placing: Phil Kraft, third, Jim Whitley, sixth, and Ron Chidgey, seventh—being congratulated by Team Manager Dr. Jim Edwards. (4) Wolfgang Matt from Liechtenstein flew "Super Star II" to second place. The design [redacted] by members of several teams. [redacted] is one of the fliers whose transmitter is fitted into a shoulder strap-supported platform. (5) Twenty-year-old Hanno Prettner of Austria with "Super Sicroly" design. Rossi 61-powered, fast, big, heavy model. Note whip antenna. (6) Josef Wester of West Germany also used Rossi power. Most used retracts, too. Note similarity of design with Prettner's model. There [redacted] definite aircraft design trends in Europe. (7) "Condor 71" flown by Ferdinand Schaden from Austria sports HP 61 engine and a Digi Fly 7 radio. It [redacted] not have retracts. (8) Lineup of "Flippers 3." Almost everyone had backup planes and brought both to the flight line just in case, but it never proved necessary. (9) Canadian Warren Hitchcox and wife with "Firebird IV" placed 18th. A fixed gear model, well flown. (10) Terence Cooper, manufacturer of Mid-West radio in England, flew his own design "Bulldog" powered by a Meteor 60 engine. Has longish tail moment. (11) Most planes were exceptionally well-finished and show extremely personalized design ideas. (12) Neatly cowed inverted HP 61 characterizes Gustaaf Cappuyns' "Tavi I". This Belgian flier used the Rowan "professional" radio system. A



transmitter is common along with an angled antenna for good R.F. pattern (U.S. manufacturers take note).

The best aircraft designs seemed to center around 650-700 sq. in. with fairly high wing loading. Prettner's airplane weighed over nine lbs. with fuel. A modestly deep, narrow fuselage with a forward C.L.A. was preferred. There were some ships with an extremely deep fuselage, but these proved to be somewhat slower and showed no advantage in rolling maneuvers. Since little wind was present, there was no chance to observe aircraft performance in gusty conditions or a crosswind. It is presumed, however, that the faster, heavier ships would prove superior under these conditions.

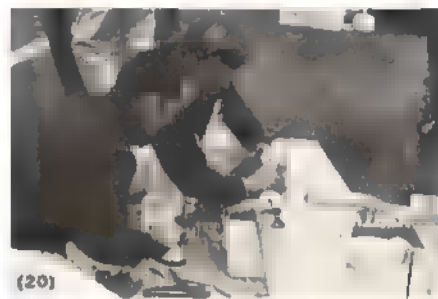
Contestants exhibited a wide range of flying abilities. Each country is authorized a team of three competitors for the World Championships. Liechtenstein had a one-man team and South Korea's team was two people but only one flew. It was apparent that RC activity and proficiency in some countries was deficient compared to others. It leads one to believe that the U.S. team should be larger, in view of the considerably larger number of highly-qualified fliers in this country. There wasn't much question in my mind that top 15 or 20 fliers could have placed very high and possibly in the top thirty places. As Tore Paulsen of Norway put it, Norway has limited activity with one major club (Vingtor RC). He says that Poju Stephansen is always

first, Knut Aker is second and he is third in team selections. Incidentally, Tore had very tough luck this year—he bashed his best ship before leaving home and had only one complete flight at the championships due to tank troubles. He maintained good humor throughout however, and it was a real pleasure to chat with him.

The Japanese team was impressive in their flying and particularly for the beauty and quality of their ships. They should be strong competition in the future.

FAI Pylon and a Thermal Soaring International Competition were held on Sunday morning. These were not championship com-

(Continued on page 57)



most attractive retract-equipped ship. (13) Norwegian Poju Stephansen has unique-looking deep fuselage "Maximum 10" plane with two military pilots aboard. Note visible fuel tank and fixed gear. (14) Swedish models are always attractive. Here Goran Ridderstrom holds his EK Pro-Series-guided "Bumling" design. Another big and heavy HP 61-powered plane. (15) These Belgian aircraft are Gerard Verlion's "Mixer" in front, and Eduard Vandermeulen's "Super Star" behind. Typical European-type planes. (16) One of the prettiest models was Wolfgang Kosche's "Charlie 14" which uses Graupner radio, neat inverted cowed Rossi 61 engine and retracts. (17) "Boomerang 3" by Jan J.B. Vilet of the Netherlands, sports S.T. G60, retracts and the new Simprop Alpha radio. Nice mid-wing design. (18) Renato Ragoni was another of the fliers using the shoulder strap-supported transmitter cradle. The entire thing becomes a stable platform. Those using it seemed to fly more smoothly. An idea worth trying. (19) Close-up of the Simprop transmitter in the "belly mount." Note the high forward strap mounts and long control sticks. (20) First real International Pylon Race, a preview for future World Championships event, was won by the consistent and fast Telford/Violet team. Used S.T. 40, Rom-Air retracts in P-51. Note light nylon wheels which don't need a door. (21) Sandy Pimenoff, FAI President, flew as Finnish team member in the provisional glider event—built his model the way the Atlantic to the meet and won. (22) Geoff Dallmer of the U.K. brought a 10' span 9" chord glider called Thermal Hopper. (23) Most remarkable and best-remembered demonstration was put on by a two-man team from Kavan, flying magnificent nearly-scale helicopters. Now in kit form from Kavan. Note fuel supply visible all times. (24) Entrants came from all countries. The Koreans from over seven thousand miles away.





THE FAST AND FUN 049 JEROBEE

by WENDEL GREEN AND ED SWEENEY

The 1/12 Scale RC McLaren car, produced by Jerobee, is both a fun toy and a fine introduction to radio-controlled car racing. Sold completely assembled (less batteries), the package includes a 14-page driver's manual which reflects Jerobee's aerospace background as a division of Rocket Research Inc., and tells the new owner everything he needs to know to get the most enjoyment from his car.

The radio control equipment is designed for license-free operation by virtue of the low-power output transmitter. Transmitter and receiver are digital systems similar to those found in much more expensive radios for airplane and car use, but range is limited because of the low-power output.

There are two versions of the Jerobee car product—one with a single servo radio and the other with two servo operations. We have only used the dual servo Comando radio/car

system. The servos are very similar to those in the bigger airplane radio control systems—each is motor driven, has an amplifier and feedback potentiometer. Thus the servos faithfully follow the control inputs at the transmitter without wagging back and forth. Dual servo system gives independent steering and throttle controls.

The cars are powered by a Cox reed valve 049 engine with the exhaust throttle system and are equipped with a pull-chord starter, flywheel, centrifugal clutch, and spur-gear output. These little engines really turn up rpm's; the cars are light so there's plenty of speed. Construction is by injection molding plastic. The workmanship in the moldings is outstanding and the design is nearly indestructible.

The 1/12 scale concept, its toy marketing and hobby appeal, and the manufacturer are the result of a unique set of cir-

cumstances. This car is not the currently popular larger 1/8 scale size. It is not designed for the hobby/modeling market. It is the lowest priced ready-to-operate radio controlled gas-powered car available anywhere. The radio system is designed and manufactured by E.K. Products, one of the major radio-control equipment manufacturers of digital proportional systems for model airplanes. The radio is produced for Jerobee, the manufacturer and marketer of the 1/12 scale cars. Practical 1/12 scale cars were developed by AAM Editor Ed Sweeney, and the Jerobee car is the result of his design concept. The idea of the 1/12 scale car was to create a high performance radio-controlled product for the toy market which would attract newcomers to modeling. Smaller cars are both safer, simpler, and much less expensive than their larger counterparts.

Two production Jerobees were driven for

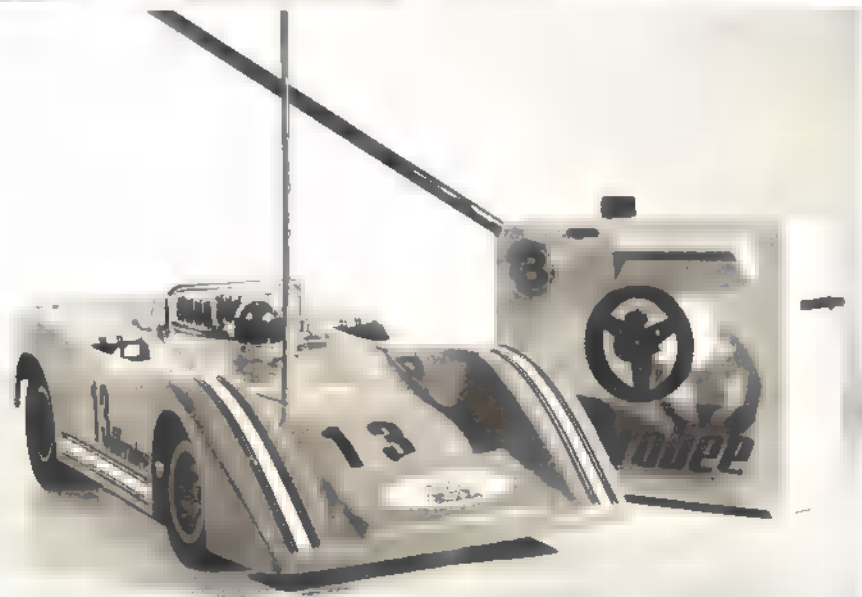


Jerobee and Auto World sponsor Oscar Koveleski's Can-Am Series McLaren MBb which is driven by Tony Adamowicz who holds a Jerobee RC model decorated to look like a Can-Am car.

Duane Lundal, Rocket Research/Jerobee man in Washington, D.C., went all-out to make this model like the Can-Am car. MonoKote trim sheets used throughout.

[Detail pictures are on page 64.]

The Jerobee McLaren decorated with the decals in the package is an attractive car. Bodies are durable and colorful.



a total of almost 20 hours of running time. Operated by experienced RC car drivers, by adults with no previous RC car experience, and by children 8 to 17 years of age, the cars were driven hard—into curbs, out of range, into each other—and survived it all. After the period of testing, the cars were filthy dirty and the decals had been scrubbed off, but the model cars were as good or better as they were when new.

Handling: The Jerobee Comando with stock molded sponge tires did not exhibit any excessive under- or over-steer characteristics. With a little practice they could be driven fast around a parking lot road course without spinning out. The tires were round and well-balanced as they came out of the box; since they are soft sponge and the cars are light (under two lbs.) the models did bounce at high speeds, but not much can be done about it. When different tires were tried, the problem was only lessened, not eliminated. Less weight/harder tires would help.

As one should expect, the smaller the model car, the smoother the racing surface
(Continued on page 62)

CG

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Complete steerable nose gear, with nylon bearing, 5/32" plated music wire strut, extra collar, blind nuts, screws — washers — \$2.50.

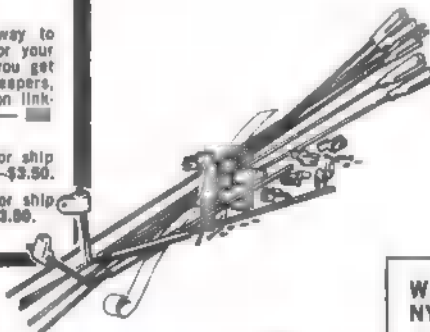


NEW—MAJOR R/C FITTINGS SETS

Here's an economical way to buy major fittings for your multi ship. In one set, you get all the horns, links, keepers, bellcranks, or strip aileron link — and hinge material — saving.

R/C Fittings Set No. 1 for ship with standard ailerons — \$3.50.

R/C Fittings Set No. 2 for ship with strip ailerons — \$3.00.



STRIP AILERON LINKAGE

This complete set has two threaded aileron horns; two nylon brackets for fine, safe (can't slip) adjustment; brass bushings; Snap-Links and rods, and Snap'R Keepers. Exceptional value — \$1.50.



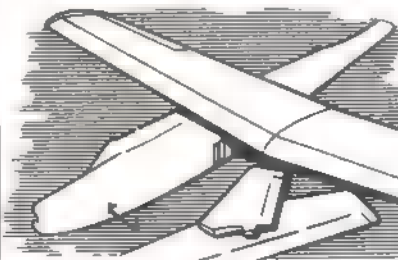
NYLON STEERING

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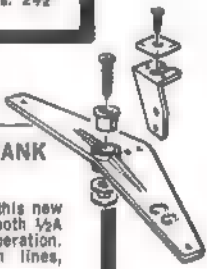
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YAKO

by CLARENCE MATHER

A peppy little tail-first sportster, Yako provides a lot of fun and performance for a small investment of time and materials. With perhaps 300 turns cranked into the motor it will zip up over treetop height and then glide down nicely to a landing.

The tail-first or canard configuration has more stability than the more common tractor and presents a distinctive appearance. But it needs to be built closely to specifications for proper flight characteristics.

Construction

Yako should be constructed mainly of medium hardness balsa. (If you are new to balsa wood ask the shop proprietor for guidance.) Measurements can be made directly from the full-size plans. Parts can be traced onto sheet balsa by utilizing soft carbon paper. Single-edge razor blades work well for cutting balsa and a metal straight edge helps to keep true lines. A piece of fine sandpaper, perhaps No. 250, wrapped around a wooden block is useful for smoothing balsa edges. A dozen pins or so are needed to hold pieces at various stages of construction. A 12 x 18" piece of insulating board or soft wood can be used as a working surface. Fast-drying plastic model airplane glues can be used, but the slower-drying white glues are preferable as they are less likely to warp the surfaces.

Cut the wing out as a single piece and mark rib locations on underside. Glue the ribs into position and immediately place the wing on the work board and pin flat, placing a piece of waxed paper between the wing and the board to prevent the wet glue from sticking to the board. If necessary, use pins to hold the wing to the curve of the ribs. Forcing the surfaces to dry in the flat position helps reduce warps so repeat the same procedure for the stabilizer.

After the glue has dried thoroughly, remove the surfaces from the work board and cut in two down the center. Prop each tip up for the required dihedral and observe the gaps



Nice thing about canards—they can carry plenty of wing area for their size and fly all that much better as a result.

at the center joint. Take each half and cut and sand the edge carefully until the joint fits snugly. If high-shrinkage plastic glues are put into a poor fitting joint there will probably be warpage. Gaps can be filled with white glues with little danger.

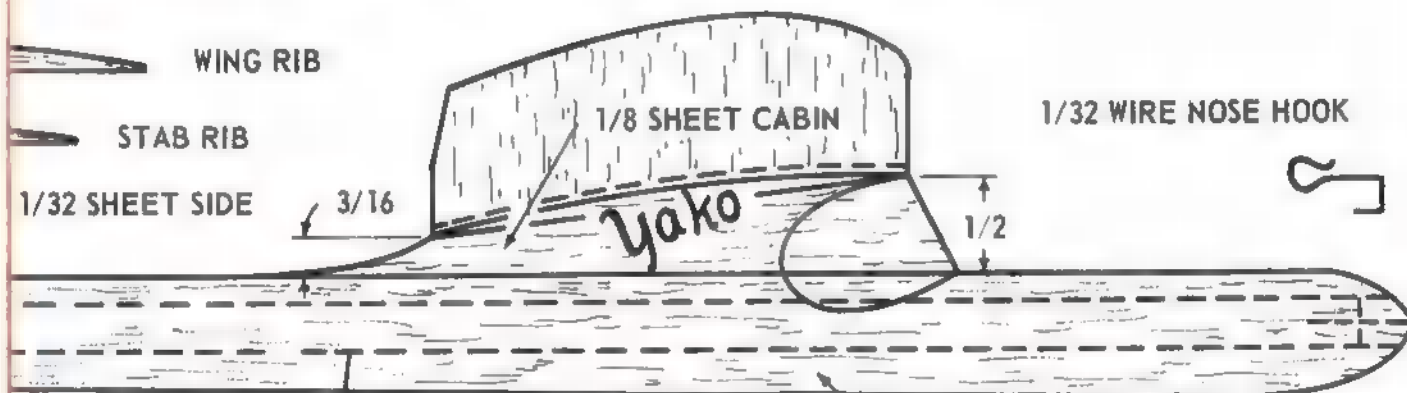
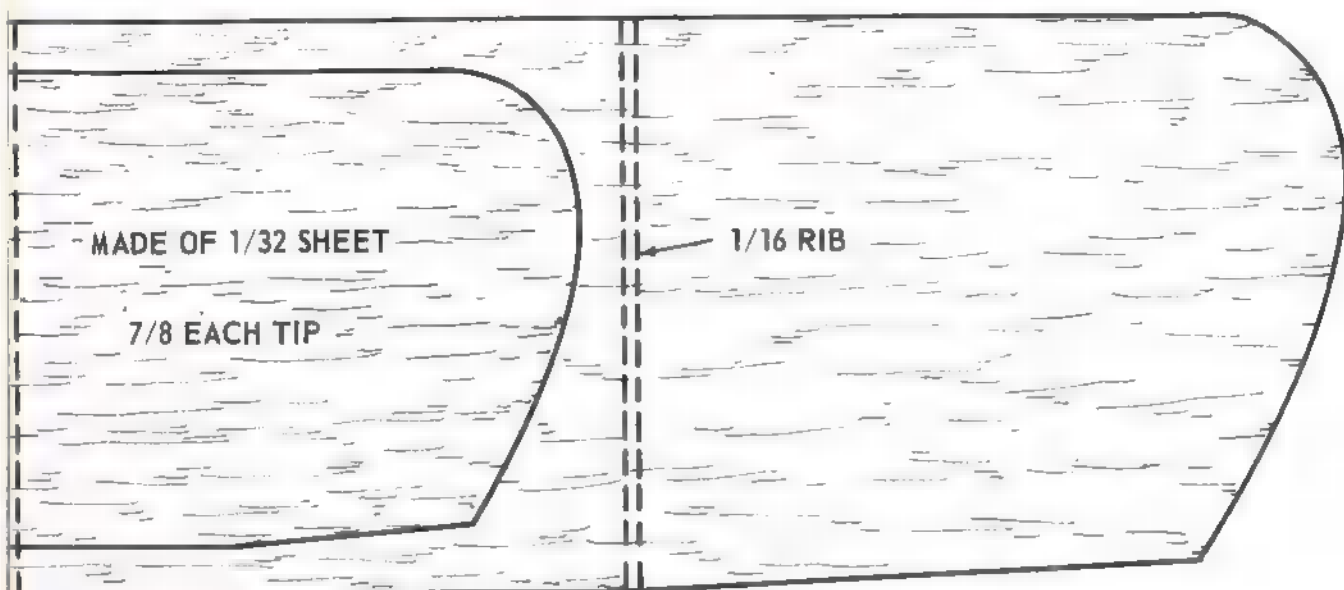
Glue the longerons to the fuselage side and add the cabin piece. Plug the front and rear spaces between the longerons to support the front hook and the prop shaft bearing. Shape the bottom of the wing center so the wing sets flush on the fuselage, as in the drawing. Then glue it into place making certain that the wing is square with the fuselage from the top view. Fit the stabilizer to the top of the cabin so that the leading edge is 5/16" higher than the trailing edge! Observe the structure from the rear and line up the stabilizer with the wing.

Round-nose pliers will facilitate bending the hooks for the rubber. Use steel "piano" wire. Bend the front hook and glue securely in position. Bend the rear hook, but leave other end straight. Cutting burrs should be removed with a file or a grind stone.

There are several types of plastic props on the market, but the red, square-tipped type is recommended because of light weight and high pitch. Obtain one of seven-in. diameter and cut 1/4" off each tip. The hole in the prop is too large for the wire, so drill it to 1/16 size and plug with a piece of 1/16" aluminum tubing. The props come with a free-wheeling ridge on the wrong end of the hub, so cut and sand the front flat.

Cut a second piece of tubing for the fuselage bearing. A razor blade will cut aluminum tubing nicely if it is pressed firmly into the tubing and rolled back and forth. Nick the surface of this tube all over so that the glue will grip it securely. Slip the prop shaft through this tube, the glass bead, and then the propeller. Bend the wire shaft over at a right angle.

(Continued on page 78)



GLUE THREAD

1/16 x 3/8 AL TUBE

BALSA PLUG

1/8 BOTTOM LONGERON

CROSS SECTION AT A-A

GLASS BEAD

1/16 AL TUBE

1/32 STEEL

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BENT PIN

3/8 LONG

WIRE

TUBE

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14" SPAN 50 SQ. IN. WING

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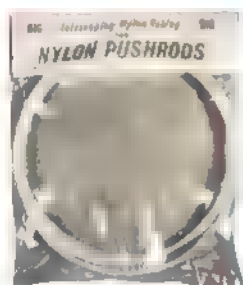
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3/32 x 3/32	.05	3/32 x 1/4	.10
3/32 x 1/8	.06	1/8 x 1/8	.08
2/32 x 3/16	.07	1/8 x 3/16	.09
3/32 x 1/4	.08	1/8 x 1/4	.11
1/8 x 1/8	.06	1/8 x 3/8	.14
1/8 x 3/16	.07	1/8 x 1/2	.17
1/8 x 1/4	.08	1/8 x 3/4	.22
1/8 x 3/8	.10	3/16 x 3/16	.12
1/8 x 1/2	.13	3/16 x 1/4	.15
1/8 x 3/4	.17	3/16 x 3/8	.19
3/16 x 3/16	.09	3/16 x 1/2	.24
3/16 x 1/4	.11	1/4 x 1/4	.20
3/16 x 3/8	.14	1/4 x 3/8	.24
3/16 x 1/2	.18	1/4 x 1/2	.30
1/4 x 1/4	.15	3/8 x 3/8	.32
1/4 x 3/8	.18		
1/4 x 1/2	.22		
3/8 x 3/8	.24		

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1/16 x 12	.03	1/8 x 36	.08
1/3 x 12	.04	3/16 x 36	.11
3/16 x 12	.05	1/4 x 36	.13
1/4 x 12	.06	5/16 x 36	.15
5/16 x 12	.07	3/8 x 36	.17
3/8 x 12	.08	1/2 x 36	.22
1/2 x 12	.09		

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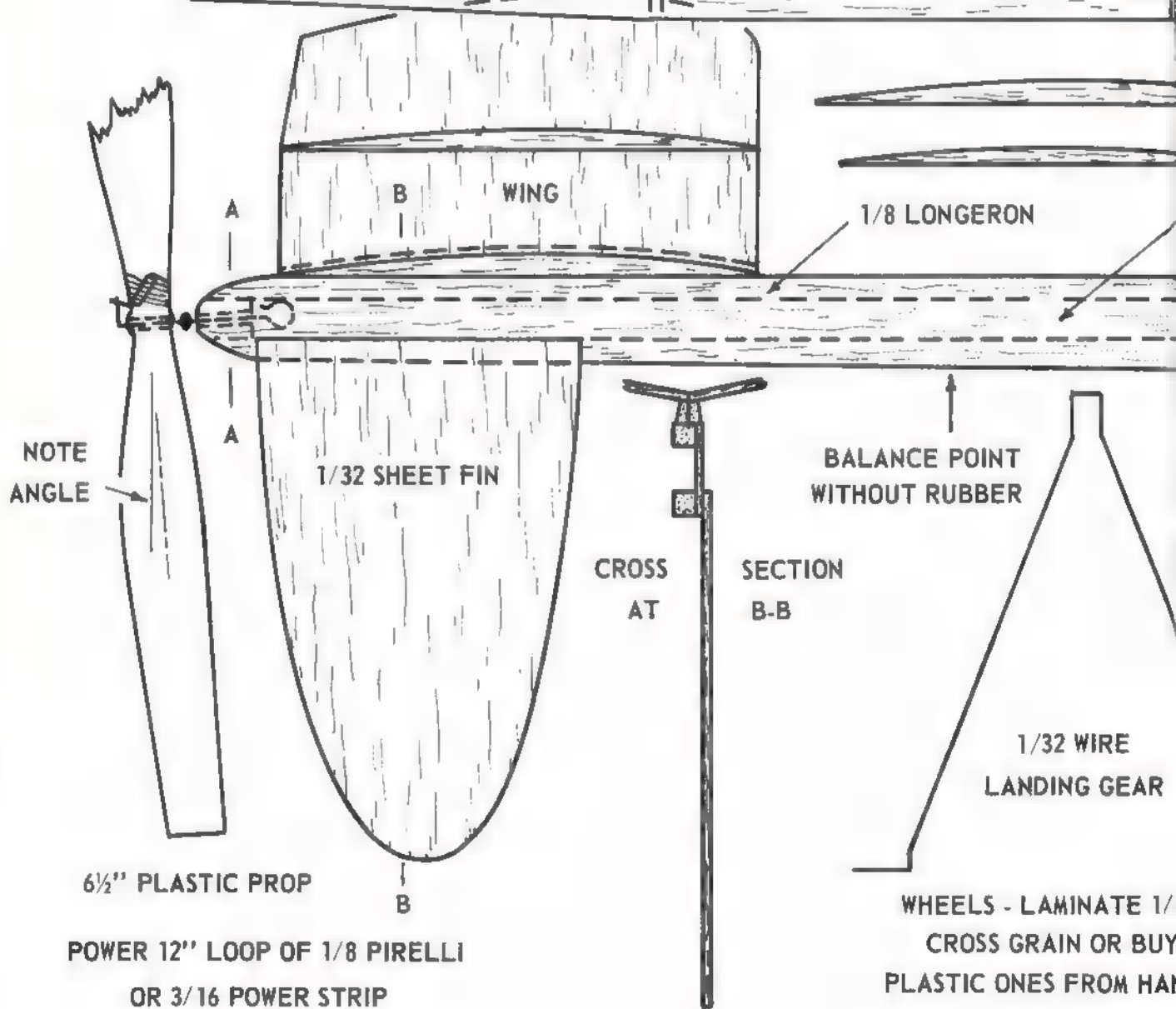
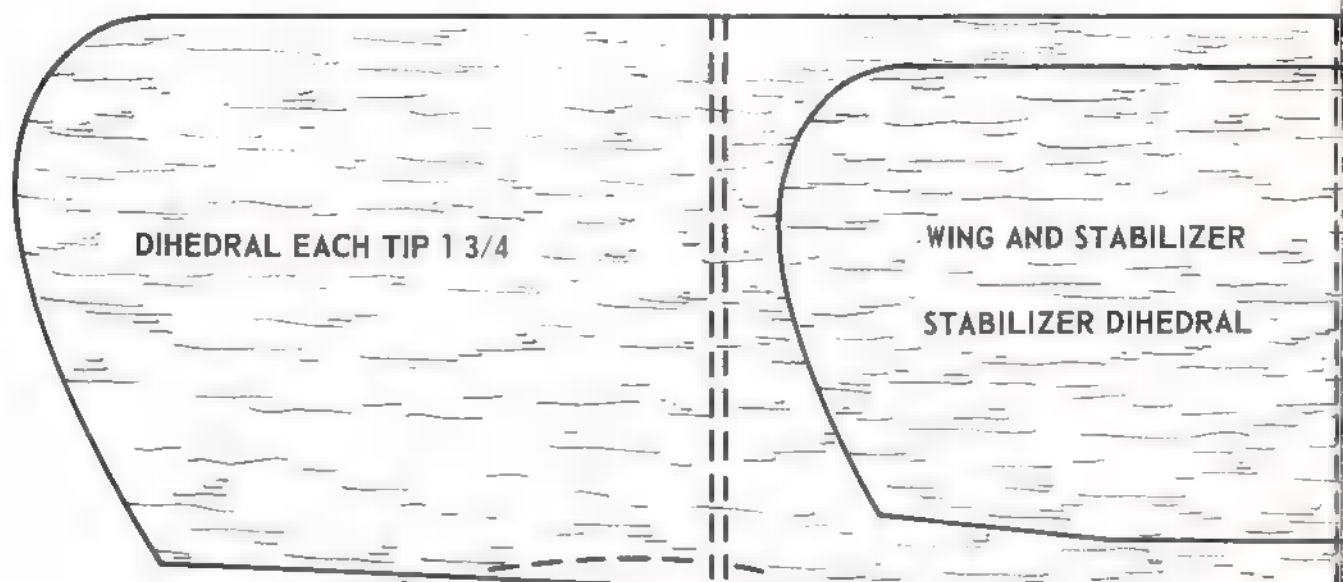


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MODEL AVIATION

Official magazine



Academy of Model Aeronautics ■ 806 Fifteenth Street N.W., Washington, DC 20005

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Reviews of National AMA Record Holders

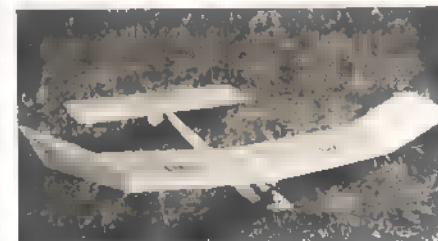
FF C Gas national AMA record, Category I, Senior age class: 31 minutes, 6 seconds, established by Raymond Faulkner (AMA 45866), Claremont, Calif., on May 2, 1971.



Faulkner's model was designed by Robert Johnson. The wing has 79" span, 11" center chord, 10 percent airfoil thickness. The stabilizer is 36" by 8". Both the wing and stab have multi-spur construction. The overall fuselage length, measured from the firewall, is 50". The model was covered with Sig Jap tissue and finished with Aero Gloss dope; weight was 34 ounces.

Power was a K & B 40 Series 69F run on Faulkner's own mix fuel of 40 percent nitro, 25 percent castor and 35 percent methanol, carried in a Perfect No. 1 tank. The engine used a Fire Ball (cool) glow plug. Tornado 10"D x 4"P prop. Engine run was controlled by a Tatone Tick-Off timer, while dethermalizing was accomplished with Sig fuse.

FF 1/2A Gas national AMA record, Category II, Senior age class: 19 minutes, 47 seconds, established by Phil Hainer, Jr. (AMA 18389), Kent, Wash., on February 7, 1971.



Power for Hainer's Starduster 350, a kit produced by Competition Models, came from a Cox TD .049, Cox Red-Can Racing Fuel, and a Cox gray prop of 5 1/2"D x 4"P. The tank mount for the engine was produced by Competition Models. A Tatone 1/2A Tick-Off

A report of selected recent record holders highlighting the designs and equipment used.

was used for controlling the engine run, Mike clothes line fuse for actuating the dethermalizer.

The model was covered with Sig Jap tissue and finished with Fuller's nitrate dope and Aero Gloss fuel proofer. One construction change incorporated in the model was the addition of wing stress webs in the center sections, said to add terrific strength and warp resistance.

Indoor Paper Stick national AMA record, AMA Ceiling category I, Junior age class: 5 minutes, 56.5 seconds, established by Barry Paillet, Brookville, N.Y. ■ March 26, 1971.

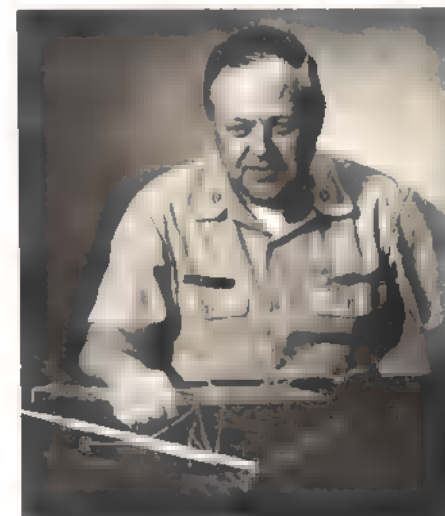


The wing of Barry's model has a span of 24 1/2" and center chord of 4 1/2", producing a projected area of 93.75 sq. ins. The stabilizer, 11 1/2" span by 4" center chord, has an area of 34.5 sq. ins. The vertical fin is underslung beneath the stabilizer. The wing and stab airfoils have 7 1/2% and 1 1/2% thicknesses, respectively. The 14" prop was formed from sheet balsa warped around a 4" diameter jar at a 30-degree angle to produce a 26" pitch. Power was supplied by two strands of .063" Firelli of 18" length—obtained from W.C. Hannan. The model used Micro-Dyne condenser paper covering, Micro-X prop bearing and teflon thrust washers, Sig rubber lube. The model basically was designed by Max Chernoff but with modifications by Jean Paillet.

On a previous date, February 25, Barry established an Indoor ROG Cabin record of 1

minute, 38 seconds in ceiling category I. The Cabin model used the same tissue-covered wing and tail as the Stick model. However, the Cabin prop was of 13" diameter and 22" pitch, and power was two 18" strands of .109" Micro-X Firelli.

Indoor R.O.G. Cabin national AMA record, AMA ceiling category III, Open age class: 29 minutes, 22.2 seconds, established by Col. Robert R. Randolph (AMA 5848), Loma Linda, Calif., on May 16, 1971.



Randolph's model appears to be an adaptation of a Stick model with a "cabin" added to give the required cross-section area. The photo shows the takeoff gear in its retracted position—powered by a single strand of monofilament nylon. An original design, the model is named Fat Cat IV.

The model's wing, 31" span by 5" center chord, is mounted off center. In plan it is similar to a reverse double ellipse, although the trailing edge is straight except for rounding at the tips. The elliptical stab is 14 1/2" x 5". The motor stick is 13" long; the tail boom and the aft rudder make up an additional 13 inches.

The prop has 16" diameter and 32" pitch. Two 18" strands of .060" rubber allowed 2240 turns to be packed in. The model was constructed from Micro-X balsa; covering was Microdyne Type B microfilm. The much-flown aircraft weighed .034 oz. when first constructed, .041 oz. when the record was established.

FF 1/4 A Gas national AMA record, Category II, Junior age class: 8 minutes, 17 seconds, established by Gerry Geraghty (AMA 37258), San Jose, Calif., on January 11, 1971.



Gerry's model is the Raider 310 which was published in Model Airplane News. It is powered by a Cox TD .049 using Cox Racing Fuel and 6"D x 3"P Top Flite prop. It used a Tatone tank mount for the engine, and Sig balsa and Ambroid cement in construction. Engine shut-off was by a Tatone 1/4 Tick-Off, and dethermalizing also was by a Tatone timer. The 6 1/2 ounce model was covered with Sig Jap tissue, finished with clear nitrate dope.

On the same date Gerry established a Cat. II A Gas national record of 5 minutes, 42 seconds. This record was also set with the Raider 310 model, but with the aircraft powered by a Cox TD .051.

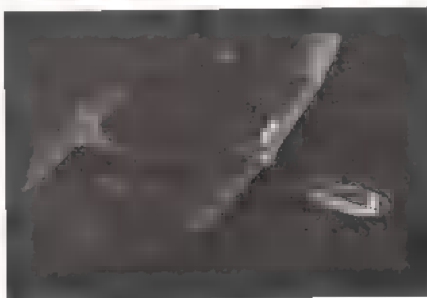
FF Coupe D'Hiver national AMA record, Senior age class: 9 minutes, 20 seconds, established by Marc Sexton, Seattle, Wash., February 7, 1971.



The model is basically the design of George Batiuk, Sr., which was sketched in Dave Linstrum's column of Model Airplane News. Main modifications were to reduce the number of stabilizer spars and to use a prop of 16" diameter by 23" pitch, Montreal-type stop, RAF 32 wing airfoil. This design has a wing a 39" span by 4 3/4" chord, stabilizer span of 14" by 3 1/2" chord. The model weighed 83 grams.

The aircraft was powered by six 11" strands of 1/4" Pirelli which was lubed with Sexton's own mix of 50% glycerin and 50% boiled green soap. It was covered with Sig Jap tissue and finished with Aero Gloss clear dope. The prop front bearing was obtained from FAI Model Supply Co., and the dethermalizer was actuated by Sig fuse.

FF Unlimited Rubber national AMA record, Category II, Senior class: 7 minutes, 58 seconds, established by Phil Hainer, Jr. (AMA 18389), Kent, Wash., on February 7, 1971.



Phil's model, an original design intended for Coupe D'Hiver, weighed 4.58 ounces. It has a wing of 38" span, 4 23/32" chord and original undercambered airfoil of 8 percent thickness. The stabilizer is 18" by 3 19/32", original 11 percent thick flat bottom airfoil. Both the wing and the stab are multi-spar. The overall fuselage length is 36". Warren truss construction; the rubber motor consisted of 8 strands of 1/4" Sig Pirelli 36" long, lubed with glycerin and green soap-carried within the forward 24" of the fuselage. The propeller, a two blade folder of 16" diameter and 19" pitch, was hand-carved. The front end thrust bearing assembly was obtained from FAI Model Supply Co.

An interesting design feature of the model is the locating of its low pylon wing mount off-center to the left. Hainer states that this allows the model to fly left under power and to use torque to good effect. A construction feature which he says adds great strength and warp control is a stress-web system built into the wing.

The model was built from Sig contest balsa which was assembled with Titebond cement and Devcon five-minute epoxy. It was covered with Sig Jap tissue and finished with three coats of Fuller clear nitrate dope followed by a final coat of clear Mar-Lac laquer for high gloss.

FF A Gas R.O.W. national AMA record, Category II, Open age class: 3 minutes, 38 seconds, established by William H. Thompson (AMA 16572), San Diego, Calif., January 3, 1971.



The model which set the record was the Strato-Streak design by Louis Garami published in the December 1941 issue of Air Trails magazine. It was equipped with sled floats for establishing the rise-off-water record. The wing has 39 1/2" span, 6" center chord, flat bottom airfoil. The stab has 18" span and 5 3/8" center chord. The model weighed eight ounces.

Thompson rates this design as easy to construct. He used Sig Balsa, Glue-Bird white glue, Jap tissue covering and Aero Gloss clear dope. Power came from a Cox TD .051, K & B 1000 fuel and Cox 6"D x 3"P prop. Other products used include a Perfect metal fuel tank and Tatone engine timer.

Thompson relates that his trying for the R.O.W. record was possible only because the field used for the Record Trials by the San Diego Orbiters happened to have water puddles that day, a rare occurrence for San Diego.

Indoor HL Glider national AMA record, AMA ceiling category I, Junior age class: 45.0 seconds, established by Bruce Pallet, Brookville, N.Y., on March 26, 1971.



The model, designed by Jean Pallet, has a wing with 16 1/2" projected span and 3" chord; each panel is swept back 15 degrees. The wing is constructed from 1/16" sheet which is then warped to produce 1/16" undercamber; .008" music wire is glued to the wing leading edge for protection against nicks. The stabilizer, 11 1/2" span by 3" center chord, is of 1/32" sheet.

FF HL Glider national AMA record, Senior age class: 4 minutes, 29 seconds, established by Marc Sisk (AMA 46368), Albuquerque, N. Mex., on April 11, 1971.



Marc used three models in completing the series of flights making up this record, two of which were lost out-of-sight, plus two more gliders which were lost during practice. None of the gliders were equipped with a dethermalizer. Design used by Marc for most of the gliders flown in this record series was the Flash by Dick Mathis, published in Flying Models magazine and currently kitted by M & P Enterprises. The Flash has a wing of 17" span and 4" center chord. The models were constructed from Sig balsa and spruce, the latter for the leading edges of the wing and stab. Epoxy cement was used throughout. Marc also posted flight scores with an original design model.

PRESIDENT'S MEMO

A TIMELY REMINDER, AMA ELECTIONS. It is election time for many of the key AMA offices. District Vice-President will be chosen for the odd-numbered districts, namely Districts I, III, V, VII, IX and XI. We must also choose a Secretary-Treasurer. Only the AMA members within a given district, of those mentioned, may vote for their District Vice-President, but the entire membership will vote on the Secretary-Treasurer position.

Every AMA member has an investment in these officers, and so has a responsibility to help choose them. If you are a current adult AMA member your voting ballot should be received about the time this magazine appears, along with your membership renewal form. (Note: Jr. and Sr. members no longer vote in AMA elections.) Both of these documents are important, so as a **GOOD AMA MEMBER**, use them!

APPOINTED OFFICERS. In order that the AMA appointive positions be held by members who realize their responsibilities and serve accordingly, all appointive positions will be considered to be on a calendar year basis—reviewed at the end of that time for possible reappointment.

IDEA FOR "SUNDAY FLYERS". To make "Sunday Flying" more fun, and to give it a constructive "payoff" as well, why not put on demonstrations or air shows for the public! This could be anything from the simplest demonstration, for a small group, to



Three AMA presidents at the Spokane Internats: John Clemens, center, past President Cliff Weirick, left, and past President and current Executive Director John Worth, right.

■ full-blown formal "staged" air show. Or it might be part of a full-scale air show. Model flying demonstrations are **ALWAYS** appreciated by the public. It relates easily, because secretly each one wishes HE was doing the flying.

You or your club can offer such services to all sorts of appreciative groups in your community. These groups include service clubs, schools, park and recreation departments, boy's clubs, Scouts, church ■ community carnivals, shut-ins, half-times at sports affairs, and lots more. You might mention your availability to your Chamber of Commerce.

Your flying in these demonstrations need not be professional, because just the flying of a model airplane, of any category, is impressive to the general public. And it is real "bait" for the youngsters who are spoiling for something worthwhile to do. I suggest that your demonstration be as informative as possible—through signs, a public address system, bull-horns, megaphone, or simple personal explanation. It is fun being an "authority"! Even more potent "bait" for the public is the offering of "training flights" on a good trainer-type model aircraft, for selected individuals among the spectators.

From personal experience I have found that the organizing of a Flight Demonstration Team is a lot of fun, with a wonderful feeling of prestige and with a great payoff in community service.

SAFETY, of course, should be your first consideration any time you fly, but it is even more important if you have attracted a crowd. If you are acting as a group, it is doubly important that your group be a chartered AMA club, or a section of a chartered AMA club. You will then be protected by the expanded insurance protection that covers the club, its individual officers, and the property owners where you are holding the activities. **THIS SURE HELPS GET SPONSORSHIPS!**

Help establish a good image for modeling! Show off model aviation!

John E. Clemens
AMA President

AL SIGNORINO

AMA District VI Vice-President (Missouri, Illinois, Indiana, Kentucky)

Albin R. Signorino started airplane modeling when he was 11 years old. Twenty five years later, at age 36, Al is serving in the very responsible position of District VI Vice-President for the Academy of Model Aeronautics. Strangely, he is far better known for one singular modeling accomplishment. Al is the designer, builder, and flyer of perhaps the most unique model airplane of all times, "Snoopy's Flying Doghouse."

The Signorino home is in the beautiful rolling hills of Maryland Heights, in the north-west part of Greater St. Louis, Missouri. Here Al and his wife, Phyllis, are raising Kim, age 11, and Butch, age 13. McDonnell-Douglas Aircraft of St. Louis is Signorino's employer. In serving this important aircraft company as a technical writer, Al's basic responsibilities are the writing of procedures for checkout of electronic equipment.

Al was born on June 22, 1935, in Wick Haven, Pa., about 30 miles south of Pittsburgh. His first 18 years were spent in Pennsylvania, with his education extending, through high school, two years of college, and an Associate Degree in Electronics at DeVry Tech. Most of his life has been involved in some manner with aviation, with four years having been served in the United States Air Force. He was an instructor in Airborne Electronics at Scott Air Force Base.

In addition to Al's present responsible position as an AMA Vice-President, he has been an RC Contest Director from 1966 to the present, and RC Contest Coordinator for District VI. He is a member of the McDonnell Radio Control Club and the Greater St. Louis

Modeling Association. He is editor of the McDonnell Club's newsletter, the Carrier Wave.

To point up Signorino's complete fascination in aviation, he has recently obtained his private license to fly full-scale aircraft, and is working now for his commercial license. He is a member of the Spirit of St. Louis Experimental Aircraft Association, Chapter 32.

Al is certainly best known for being the "father" of the radio-controlled "Snoopy's Flying Doghouse." This almost unbelievable (until you see it fly!) reproduction of the flying doghouse of the popular comic strip character, Snoopy, opens up an entirely new facet of promotion and "image" for model aviation. Through the "Snoopy and the Red Baron" skit flown by Al and his fantastic model plane, children and adults alike relate to Snoopy's wonderful nostalgic World War I fantasies. Then they suddenly realize that this is being done with a model airplane. This demonstration is a public relations man's dream, and is a terrific tool in the establishing

of a favorable and exciting image for model aviation. Modeling owes a debt of gratitude to Al Signorino for this contribution!

For those of a technical mind, Snoopy's Doghouse, Signorino version, is shaped exactly like a doghouse, and Snoopy sits on its roof as its pilot in flying regalia. It is powered with an Enya 60 gas engine, guided by a Controaire Radio, and is supported in the air by a wing (actually the floor of the doghouse shaped in an airfoil, 27 by 28 inches) of about 756 square inches area.

As further tribute to Al's designing genius it must be mentioned that the Doghouse flew successfully "right off the drawing board," being flown in a model air show at Rheinfelden, N.Y., for its sixth flight. The Doghouse being flown at present is actually model number "4 1/2", with only one major design change having been made since the original. Snoopy now has about 175 flights of the Doghouse in his logbook, with only six crashes on the first three models, and only one on the present excellent version. That one was caused by battery failure.

The "Snoopy and the Red Baron" skit is flown somewhere almost every weekend, weather permitting. Sometimes two air shows are flown in different locations on one weekend. In Snoopy's logbook are about 50 air shows in twelve States and Canada in three years. Some of the finest demonstrations have been made at AMA's National Model Airplane Championships. A salute to Al and Snoopy, and "curse you Red Baron!"

Signorino has one more unusual side to his aeronautical interests. He is collecting "antique" radio control equipment. His collection of about three dozen "old-timer" RC rigs is at present just stored in boxes, Al feeling that it is not yet complete enough for public display. Al would be very pleased to



Al Signorino, District VI V.P.

hear from anyone having equipment along this line that might add to this unusual collection. Contact: Al Signorino, 11959 Glenvalley Drive, Maryland Heights, Mo. 63043.

Looking at this dignified, quiet, dark-headed young man, and the thoughtful way that he conducts himself in AMA Executive Council meetings, one would never dream that he is the "flying instructor" for the swashbuckling Snoopy and his famous Doghouse.

EARL DENNY
Office Manager
AMA Headquarters Staff



Earl Denny, Office Manager

Earl L. Denny, The AMA HQ Manager, started life out with a bang by being born on the Fourth of July. That was 41 years ago in a community which no longer exists—Darrow, Ill. Darrow was a community of one grain elevator, a railroad spur and four houses. Earl moved to a much larger town of 200 people. Since then Earl has been around the world with the military. He now lives with his wife, Willie Mae, in Woodbridge, Va., a few miles south of Washington, D.C., on the Potomac River. Earl is the father of three children, ages 13, 17 and 19.

Denny's career previous to his employment by AMA was 21 years of combined service and education in the military, retiring from the U.S. Air Force with the rank of Master Sergeant. He has shown a tremendous appetite for education, graduating from high school at Stockland, Ill., 90 miles south of Chicago, and attending the University of Florida, University of Arkansas; he is with the University of Maryland at the present time.

Earl needs only one more course to earn a degree at Maryland. Sandwiched into all of this education were courses in the military which covered administration, intelligence, disaster control and management. Earl took first place in a speech contest in the Second Air Force Non-Commissioned Officers Academy (out of a class of 120 NCO's) at Barksdale AFB in Louisiana. Over the years Earl has also added correspondence courses on many subjects.

Travel is very educational, too, and during Denny's military career he traveled West Germany, Italy, France, Japan, Taiwan, the halls of the Pentagon, and many of the United States.

Earl's business experience outside of the military includes the filling of part-time positions as a news writer for a local paper (the Potomac News, Dumfries, Va.) real estate salesman in Little Rock, Ark., and a life insurance salesman in Jacksonville, Ark.

Denny claims as his primary hobby the completing of his education. Secondary interests follow the same pattern: reading, stamp collecting and service club work. Presently he is president of the Woodbridge Civitan Club which emphasizes support of programs for retarded children. He has been local president of the Toastmasters International (public speaking service group), winning several Toastmaster Contests. Earl serves as a deacon and men's bible teacher at a local Southern Baptist Church, and is a member of the Marumco Woods Citizens Assn.

Earl has been employed by the Academy of Model Aeronautics in the Washington headquarters since August of 1969 as Office Manager. His duties include all membership processing responsibilities, the same for chartered clubs, directing of office personnel, and other related duties and functions. Earl's background and education serve him very well in his present duties for AMA. He is an excellent organizer, and his experience as a speaker allows him to express himself well in handling personnel and communicative problems. In working with Earl one always gets the feeling that he is eager to serve and anxious to get it right.

Denny is one of the few people connected in any way with the AMA who has had no experience in model airplaning beyond throwing a few gliders as a kid. This serves AMA well because, different from most of us, Earl's attitude is all business, not diluted in any way by an inflated love for modeling. In serving AMA, his friends and his community, Earl's most powerful tool is a big cheerful round-faced smile, making Earl Denny a pleasure to work with.

AMA News Bits

VFSS RC Pilot Qualification

The AMA chartered Valley Forge Signal Seekers (Pa.) are now utilizing a Pilot Qualification Program which was worked out by VFSS Vice-President Tom Jarick (AMA 16675) to insure safety to all flyers (members and visiting non-members) who use the VFSS flying site.

To receive the club's "Safety Qualified" tag, a pilot's model is first inspected for any obvious violations of construction which might affect airworthiness. Then the flyer must demonstrate his ability to safely control the model on the ground and in the air.

The qualifying flight consists of a takeoff or a hand launch, a climb to safe altitude, a circle around the field, and a controlled landing in the mowed area. The flyer is expected to advise the examiner beforehand if he is going to circle to the right or left after takeoff and when he is going to attempt landing. According to the VFSS rules, flight must be relatively smooth and without close calls or near misses. If, upon completion of the demonstration, the examiner is satisfied that the flyer meets the minimum standards of competence, the flyer is issued a "Qualification Tag" which he must display at all subsequent flying.

Good program.

More Hlaa FLYing

The interest of youngsters in Airplane models continues to grow, as was indicated by the turnout of over 200 contestants in the Centre Region Indoor Model Aircraft Meet earlier this year. The meet, sponsored by AMA chartered State College Radio Control Club (Pa.) and the State College Park and



Cliff Telford and Bobby Violet flew Clery-Wisniewski 60-powered RC Speed model in September DCRRC FAI Trials—clocked 198 mph into wind, but timers missed best downwind passes. Record is 198.8 mph.

Recreation Department, included competitions for Delta Dart models (featuring the Hlaa FLYer model) and for tissue-covered rubber-powered models. Featured were demonstrations of two microfilm models and Bill Brown's (AMA 72439) small CO-2 powered models. It is interesting to note that sex had no bearing in this contest as two of the eight first and second place winners were young ladies.

Contest Director Albert Niessner, Jr. (AMA 19108) is appreciative of the Hobby Industry Association of America for having supplied the Delta Dart Models as well as the prize ribbons and certificates. He looks forward to another contest next year.

AMA chartered clubs can still participate in the AMA-HIAA Delta Dart Program and obtain the Delta Dart model kits plus publicity and prize package. If the Application for Delta Dart Sanction (previously distributed to chartered clubs) has become misplaced, write to AMA HQ and request another one.

Powerful Starter Batteries

John Laird recently built a box to completely enclose his electric starter battery since he accidentally discovered its tremendous energy when a screwdriver somehow shorted it out. Fortunately, the chance shorting occurred on the flying field where the smoke created brought it quickly to his attention; just imagine the potential for fire if it had occurred in a closed car trunk. John's starter battery is now completely isolated in his field box. The leads for both

the starter motor and battery charger are connected by jacks in the side of the field box. This information came from Low Passes, newsletter of the Long Island (N.Y.) RC Society.

Ask Questions

Milt Stevens (AMA 71333) of the AMA chartered Capital Area Radio Drone Squadron club (Lansing, Mich.) realizes that RC flying is not an innate talent: "none of us was born with this knowledge." The only way to achieve RC success and minimize one's mistakes is to ask questions and learn to do things properly. "Steve" dedicated his column in 'The Bee Line, the CARDS' newsletter, to new members who are just getting started in RC. He says, "It is far better to do it properly than to arrive at the field and have your instructor tell you that your plane is incapable of flight...there are always problems, and there is always someone to answer them."

So ask; ask questions and reap your own rewards!

For RC Retracts

"Retracts will sure educate you fast." "I don't think I'll ever build another pattern ship without them." These are quotes taken from Squawk Sheet, newsletter of the AMA chartered Port Arthur Radio Control Club of Nederland, Tex., alias "The Oily Birds." The newsletter editor admits that retracts are a pain, "but in the air, they're worth all of it!" He made this evaluation one Sunday when he experienced the sensation of his model easing into each maneuver without any apparent effort. Retracts, he says, cause quicker and more positive reactions resulting in fewer corrections being necessary.

RC Wing Saddles

An idea suggested in the newsletter of the AMA chartered Acadian RC Club, Lafayette, La., uses silicone sealant to produce an excellent, resilient, form-fitting wing mount. First, the fuselage is cut to allow 3/16" to 1/4" space between the fuselage and eventual wing position. Then the wing center is covered with waxed paper, and the fuselage is masked to within 1/32" of the edge of the saddle. Finally, the wing is mounted to the fuselage in its proper location, and a heavy bead of silicone is run along the joint, then forced inside the joint with a finger, forming a small fillet along the outside at the same time. The last step, once the silicone has cured, is to form a fillet on the inside of the fuselage where the first application of silicone overhangs.

What started out as a Christmas gift for young Rick and Mike Rasmussen turned out to be an enjoyable experience for mom and dad, too. The family's first plane was the Cessna Skylane which was under construction by Rick in photo right. The whole family, Mike, Bob, Mary and Rick, are shown below with the plane. The Skylane is powered by an OS Max 35; control is by 4-channel Kraft Series 70. Latest plane is a Trainermaster. The lady of the family soloed in just three flights, with the assistance of a "Buddy Box". All AMA members.



No Generation Gap

Mrs. Robert R. Rasmussen, an enthusiastic Napa (Calif.) fan of modeling, and mother of Rick (AMA 87374) and Mike (AMA 87373) Rasmussen, two very enthusiastic modelers writes:

"As parents in this day of the 'generation gap' we can really appreciate this hobby that has given us an exciting common interest to share with our boys.

"We have noticed something else about the sport—the kind of people you meet at the flying field—the kind of people you are happy to have as friends. They are always ready and willing to help the other guy—a trait which is all too lacking in this day and age."

Mrs. Rasmussen wrote that the boys had been flying Control Line for only about a year before the "RC bug" bit them. At first the parents were dubious because of the cost, but finally they relented last Christmas, foregoing the color TV they had planned on. Now, her words are, "I can honestly say we have never made a better investment in family fun." By the way, mom and dad as well as Rick and Mike have all had turns at flying the family's first plane, a Skylane 62. A Trainermaster was under construction when she wrote.

Old-Timers Want New Design

The Society of Antique Modelers, the old-timer and antique model group, is holding a

Below Left: Though many world records were tried for at Sept. DCRC FAI Trials, the only success was had by Gene Holt. His helicopter was flown to 850 feet altitude for a new record. Below Right: Well known FF Scale flyer, and editor of Flightmasters Newsletter, is Fernando Ramos. Diesel-powered Free Flight Sopwith Racer shown. Bill Hannan photo.



contest to develop a new SAM symbol for in the society's literature, on T-shirts, etc. The winner of the design competition, which closes Dec. 1, 1971, will be awarded a good "flying" engine donated by SAM President Bill Ladner (AMA 30252) of Whittier, Calif.

SAM offers a complete set of old-time flying rules and a one year membership for \$2. Send to Woody Bartlett (AMA 11222), Secretary, Society of Antique Modelers, 5250 Lucerne, Kalamazoo, Michigan 49004.

Free Is No Good?

Dick Franco (AMA 54801), editor of the AMA chartered Southern Alameda County (Calif.) RC'ers newsletter, offered his club members free silk-screening of the club emblem on their white shirts. Imagine only two takers, both new club members! Later on Dick said he realized he could have made the job seem worthwhile simply by charging members, but being the good Samaritan he is,

he decided to provide his labor for free—a rare thing these days but a great way (when the members cooperate) to create club identity.

Church Promotes Modeling

"Another junior club is on the scene," writes William P. Beck (AMA 26718), a World War II veteran and former member of the pre-war Quaker City Model Airplane Association of Philadelphia, Pa., also a former AMA junior Committee member. Using the 1st Presbyterian Church's parking lot (Lakewood, Colo.) as his flying site, Beck's flight with a Guillow Fairchild 24 inspired Rev. John Holzman to ask him to help organize a flying club for juniors.

Already the new Lakewood Eagles has begun to make progress. The club has held one contest using the simple Delta Dart rubber-powered model, with the plan being to increase the degree of difficulty as the

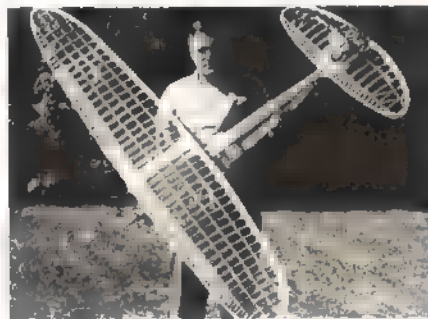
youngsters gain experience and improve their skills. The Church purchases the modeling supplies with money collected from the 25 cents dues that the 10 to 13-year-old modelers pay weekly.

Publicity Guide

"If only I had had the above-mentioned Publicity Guide about six months ago!" wrote Dick Satterlee (AMA 84988), secretary of the AMA chartered Harbor Soaring Society in California. He was speaking of the frustrations he had experienced in promoting the club's big Western R/C Soaring Championships last June and of the help that the AMA Publicity Guide had been—once obtained. Which reminds us to say that obtaining the AMA Publicity Guide is one of the benefits of AMA club charter. Free club charter information is available from AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005.



Above: The AMA Distinguished Service Award was presented to Ocie Rendell (center) of Fresno, Calif., during the big FF contest last June at Taft, Shering spotlight in Ocie's wife, Hazel, and presenting the award on behalf of the AMA Executive Council is Bob Meuser, Dist. X Associate V.P. Bill Booth photo. Upper Right: Who's the guy in the second cockpit? Photographer Murry Frank says it's a baby "possum". Seen at Dallas RC Contest. Right: Webra diesel is favored by Raymond Leone for "Bonzo" CL Scale Racer. Lots of laps, no burned-out plugs, no batteries, etc.



Some of the models for the North Jersey RC Club RC Oldtimer meet last July. Left: Woody Woodman's Taibi Hornet. Above L: Framework of Richard Tanis' 90" Flying Quaker. Above: Comet Sailplane by Russ Glasgow. Right: This Flying Quaker was by Danny Sheelds. The contest's change of pace proved to be popular. Photos submitted by Joe Beshar.

AMA News Extra

RC WORLD CHAMPIONSHIPS--GIEZENDANNER REPEAT WINNER

Bruno Giezendanner of Switzerland took an early first round lead in the Seventh Aerobatic World Championships for RC models at Doylestown, Pa., September 15-19. There was no certainty that the reigning World Champion's lead would be maintained, however, because it was known that the five judges at Site 1 were, on average, awarding higher points than those at Site 2. Giezendanner was among half the contestants whose first flight was at Site 1, and he recorded the highest single score of the meet--7,075 points (total for five judges). The big question, whether Giezendanner's flying was far superior to all the others, would be answered during Round 2 when he and contestants up to number 31 would be flying before the judges at Site 2, and contestants 32 through 62 would be flying before the judges which had awarded the high score to 25-year-old Giezendanner.

The contest wasn't "in the bag" by any means. Both U.S.A.'s Phil Kraft, in second place in Round 1, and Liechtenstein's Wolfgang Matt, 9th place in Round 1 before Site 2 judges, pulled ahead of Bruno during Round 2--Matt to first place, and Kraft continued in second. During Round 3, when the judging teams were regrouped for this round and also Round 4 (which seemed to result in more even scoring at the two sites), there was only minor shifting in the top positions: Matt stayed on top, but Giezendanner moved up to second while Kraft went to third. And young Hanno Prettnner of Austria as well as our own Jim Whitley were pushing the leaders, only 375 points separation from first to fourth.

Round 4 pressure was intense! An extraordinary flight by any of the runners-up could result in victory. Of the leaders, Hanno Prettnner was first to fly--6,225 points at Site 2. This was better than one of his previous flights, bringing his best three-flight total (counted in final scoring) to 19,095 points. Next among the leaders, also at Site 2, was Giezendanner. Seemingly with nerves of steel he skillfully piloted the Marabu model, designed by he and brother Emil, through the 15 maneuvers of the FAI Aerobatic schedule: 6,785 points for a three-flight total of 20,315. Late in the day Phil Kraft was putting in his fourth flight at Site 2 while at about the same time Wolfgang Matt was flying at Site 1. Here was the last chance for the U.S.A., or any other country, to unseat the champion. But this was not to be. Matt turned in his best score, and the second best score of all the flyers, of 7,040 points for a grand total of 20,275 for second place. Kraft also produced an excellent flight, the second best scoring of his four rounds. When contest tabulation had extended the judges' scores by applying the K-factors, it was found that the flight had earned 6,380 points for a total of 19,455 and third place.

American team members Jim Whitley and Ron Chidgey were applying plenty of pressure on their own. They were 5th and 7th, respectively, for Round 1; 4th and 6th at the end of Round 2; 5th and 7th at the end of Round 3; and their final finish positions were 6th and 7th. Both performed outstandingly, and coupled with Phil Kraft's 3rd place victory, this assured the Team Championship for the U.S.A. Switzerland was second place in team standing.

International Pylon Race & Soaring Contests

Immediately following the Aerobatic World Championships there were International Contests for FAI Pylon Racing, which attracted flyers from seven nations, and FAI Thermal Soaring, in which six nations competed. The Telford-Violett team, which had previously won the event at the National Contest, was the winner in Pylon Racing; the team was awarded the new Sir Thomas Sopwith perpetual trophy. The International Thermal Soaring Contest winner was Sandy Pimenoff of Finland. Pimenoff, who is president of the FAI Committee for International Aero Modeling and who was Finnish team manager during the Aerobatic World Championships, flew to first place in glider which he had just completed during the few days before.

By special arrangement with the publisher this page is produced at the very last minute, just before the magazine is printed, to bring you the latest concerning current Academy of Model Aeronautics events of national significance.

BMA Scholarship Contest

Marty Thompson (AMA 26406) of Livermore, Calif., was the big winner of the AMA sanctioned 1971 BMA Model Aeronautics Scholarship Contest for young (18 or under) modelers. The contest, the second of these annual events, was held at the Boeing Space Center in Kent, Wash.

BMA is the Boeing Management Association of The Boeing Company. It sponsors these contests in a marvelous effort to encourage young people in the design, construction and flight of model airplanes and rocketry. In addition to the more typical, but excellent, contest award trophies, the winner receives a \$1,500 college scholarship.

Another reason for the participation of the Boeing Management Association in modeling is to add encouragement and incentive for budding young aerospace engineers and scientists to develop modeling skills and experience and, thereby, learn more about the field of aeronautics and aerospace.

A new feature this year was a "fly-for-fun" event for those too young or too inexperienced to enter the scholarship competition. The BMA provided Delta Dart kits and also provided instruction for building the

models. Likely these youngsters will be future Scholarship Contest entrants.

Seventy-one contestants from California, British Columbia, Idaho, Oregon and Ohio entered the 1971 BMA Scholarship Contest, and an estimated 7,000 spectators witnessed the two days of model flying in Indoor, Outdoor Free Flight, Control Line and Rocketry classes. Event prizes consisted of 86 trophies and over 30 other awards!



Marty Thompson, age 16, won each of the four events he entered, an outstanding record that gave him the title of Contest Grand Champion and the \$1,500 scholarship. Phil Hainer (AMA 18399) from Seattle was runner-up, and Rick Sironen (AMA 71549), also from Seattle, was second runner-up.

Next year's contest is being eagerly awaited by young model builders, especially those on the West Coast. The BMA is giving them a tremendous opportunity to get involved in competition and truly to profit by the experience.



Below: BMA Scholarship winner Marty Thompson (ctr.) and runners-up Phil Hainer (L) and Richard Sironen (R). Above Middle: CL Scale Racing entrant Ken Klinger of Tacoma, Wash. Middle Right: Another entrant in popular Scale Racing event — Dave Monroe, Springfield, Ore. Top and Bottom Right: Scholarship Contest flyers in FF Helicopter and Payload.



CONTEST CALENDAR Official Sanctioned Contests of the Academy of Model Aeronautics

NOV. 7—ODESSA, TEX. Odessa Prop Busters RC Club Fun-Fly. Site: Prop Buster RC Park. S. Hood CD, 4110 E. 37th, Odessa, Tex. 79760. Sponsor: Odessa Prop Busters RC Club.

NOV. 7—PHILADELPHIA, PENNA. (AA) Flying Bucks AA Indoor Cat. II Meet. Site: Philadelphia, J. VanSant, Jr. CD, 337 Parkview Ave., Pennel, Penna. 19047. Sponsor: Flying Bucks of Levittown.

NOV. 13-14—TAFT, CALIF. (AAA) San Valeers Annual FF Meet. Site: Taft. H. Thompson CD, 24001 Archwood, Canoga Park, Calif. 91304. Sponsor: San Valeers.

NOV. 21—SACRAMENTO, CALIF. (AA) Northern Calif. FF Council FF Meet. Site: Weigel Field. R. Fallon CD, 2667 61st St.,

Sacramento, Calif. 95817. Sponsor: Stockton Gas Model Club.

NOV. 21—VAN NUYS, CALIF. Northrop 5th Annual Flying Wing Contest. Site: Sepulveda Basin. C. Hattrak CD, 3825 W. 144th St., Hawthorne, Calif. 90250.

NOV. 21—ROCKLEDGE, FLA. 4th Annual Scale RC Meet. Site: Club Flying Field. G. Jordan CD, Box 3331, Cocoa, Fla. 32922. Sponsor: Spaceport RC'ers.

NOV. 28—NEAR Kerman, CALIF. (A) Fresno Monthly FF Gas Meet (Cat. I). Site: Near Kerman. F. Gallo CD, 1725 Kenmore Dr., W. Fresno, Calif. Sponsor: Fresno Gas Model Club.

NOV. 28—VAN NUYS, CALIF. 3rd Annual Jumbo Rubber Scale Meet. Site: Van Nuys (Basin). C. Hattrak CD, 3825 W. 144th St., Hawthorne, Calif. 90250. Sponsor: N.A.R. Flightmasters.

DEC. 26—NEAR Kerman, CALIF. (A) Fresno Monthly FF Gas Meet (Cat. I). Site:

Near Kerman. F. Gallo CD, 1725 Kenmore Dr., W. Fresno, Calif. 93703. Sponsor: Fresno Gas Model Club.

DEC. 26-28—TUCSON, ARIZ. (AA) 1971 Winter RC Nationals. Site: Marana Air Park. R. Angus CD, 6640 N. Columbus, Tucson, Ariz. 85718. Sponsor: Tucson Radio Control Club.

DEC. 31-JAN. 1-2-3—WINTER PARK, FLA. (AA) Tangerine International RC Championships. Site: R.C.A.C.F. Field. W. Schoonard CD, 2080 Sharon Dr., Winter Park, Fla. 32789.

AMA OFFICER DIRECTORY

The most recent complete directory was published in the October AAM, page 64.

Seasons Greetings

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R/C World Championships (continued from page 41)

petitions and used provisional rules established for the events. Seven countries entered the Pylon event. After four rounds of flying, the USA National champions, Telford/Violet, emerged victorious on the basis of four wins and better time than A. Mann of England, who also had four heat wins. T/V flew their Mustang retract-equipped, St. 40 ABC-powered ship which they had also used to win the Nats. Their win was the result of careful preparation, fine flying and an extremely fast airplane. A. Mann did well and his ship seemed fast, but his flying was not as smooth or tight as Bob Violet's. American Terry Prather also used a Mustang-like design with retracts and S.T. ABC 40. He suffered the misfortune of a collapsing gear in one heat, however, and got a big fat zero. He had the best time of the meet—1:53.6. Second best time was T/V at 1:57.5. Bob Smith had some engine difficulties which bogged him down.

A thermal soaring event completed the formal competition on Sunday. Sandy Pimenoff, the current president of the FAI Committee for International Aero Modeling (CIAM), was the eventual winner after two rounds. Sandy started building his craft on the flight over and completed it after arriving! A real plus for prefabricated kits.

Flying demonstrations were meshed into the schedule during breaks and following completion of competition on Sunday. The most impressive was that of the Kavan factory team and their Huey helicopters—hovering, formation flying, wing overs, etc. performing

with great precision. Practical helicopter design has finally arrived. In addition, demos were put on by Maxey Hester with his Nats-winning Ryan S.T., Norm Page and his Avenger, Tony Bonetti, Al Signarino and his Doghouse, this reporter and others.

It was an experience of a lifetime, never to be forgotten, chock full of good flying and good fellowship with modelers from around the world. I only hope that we can arrange another championship in this country at a future date. Our hats are off to all those who invested so much volunteer time and effort to make the event possible. It is easy for some to criticize for small irritations, but in overall perspective it was simply a heck of a job. Well done!

FIREBALL

(continued from page 14)

Construction

The original kit supplied the fuselage blocks carved to shape but rough. A good sanding inside and out was needed to clean them up. For your model, select two 3 x 3 x 24 1/2" long blocks of soft balsa that will lend themselves to carving. Don't let the idea of carving a fuselage from solid blocks scare you off. It is quite easy if you have a band saw and carving chisels. If not, it is still easy—it just takes longer.

Lay out the top profile on both blocks. Cut along this profile with the band saw. When this is done, lay out the side profile and cut this on the band saw. You now have two blocks that are beginning to resemble a fuselage. Tack-glue the two halves together.

Be sure to use very little glue—as soon as the outside is carved to shape you will have to cut the two halves apart. After the glue has dried overnight you are ready to carve. Do not start until you have established the centerlines and template lines. Use hard cardboard for the templates. A file folder works fine.

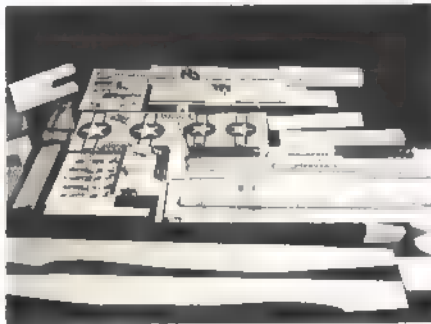
Start carving at the template lines first. Keep fitting the template in place until you get the correct profile. When you have all the template lines cut to shape, finish carving by removing the material between the template lines. By now it should be resembling the finished fuselage. Sand the two halves thoroughly before cutting them apart. When the two halves are separated, draw the area on each that is to be hollowed. Here again templates will help. Don't try to gouge out a big hunk of balsa to get the job done fast. Carve slowly and be very deliberate with each move, checking the depth with a template often.

If you study the inboard profile on the plans, you will see that the fuselage bottom can be hollowed out by layers. The first is one in. deep. The depth of the next layers depend upon their location. The area for the battery box, coil, condenser, and engine should be hollowed last. Be sure to leave enough balsa in the area of the rear wing hold-down hooks. While cutting out for the hardwood engine mount, be sure to get a good fit.

Set the bottom half aside and hollow the top half, being careful by using templates. When you have finished hollowing the top half, cut a 1/8" wide slot 1/8" deep for the rudder. Be sure to stay on the centerline that was established. The cutout for the wing and stabilizer may be made now. Be sure to fit the

new products check list

by FRANK PIERCE



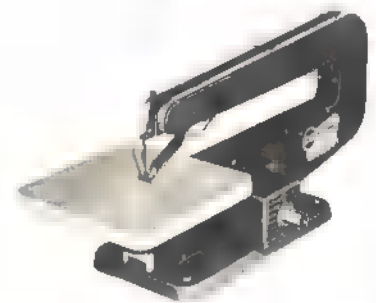
Top Flite/P-51B Mustang. Stand-off scale kit designed by Dave Platt is so close to actual scale model that only a ruler can tell the difference. 60"-span plane has no tricky handling characteristics, flies like any RC sports model. Built-up construction of high quality pre-cut balsa, kit comes complete with nylon hardware, formed landing gear, canopy, etc. Full-length machine-cut fuselage sides, fully sheeted wings, finished ailerons, flaps add to ruggedness and accurate appearance. Detailed finishing and painting information provided. Approximate cost: \$40. Shown in the photo ■ new Olive Drab and Dove Grey Super MonoKote rolls which are authentic colors for the P-51. Available separately at \$1.35 per running foot. Top Flite Models, Inc., 2635 S. Wabash Ave., Chicago, Ill. 60616

Kaiser Models/Wing-Mounts. "E-Z Wing-Mounts" consist of two birch blocks with spurred aluminum inserts which won't vibrate loose in flight. Inserts threaded to take 1/4" nylon wing bolts. 50 cents per pack of two. Kaiser Models, 1216 Juneau Drive, Billings, Mont. 59102



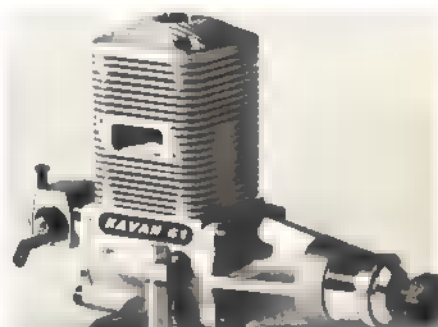
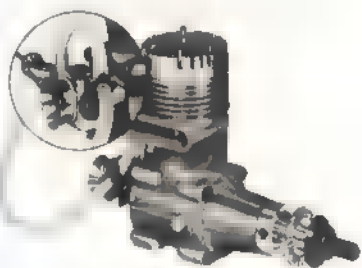
Model Engineering/Cover Cutter. Professional quality tool for cutting nylon, Silkspan, MonoKote, etc. Balanced sharp stainless steel ■ allows cutting ■ trimming in otherwise inaccessible places. Protective cap included. \$2. Model Engineering, 3655 Calumet Rd., Decatur, Ga. 30034

C & F Mfg./Scale racing drivers. Realistic scale drivers for 1/8-scale racing cars wear ■ "Star" helmets with clear visor. Head and shoulders with 4 x 4" equipment-cover base, 60 cents; head, arms, seat back, wheel, instrument panel with 5 x 6" base, \$1.29. Easily painted for extra realism. C & F Mfg. 617B Fashion Park St., Orange, Calif. 92666



Dremel Mfg. Co./"MotoShop." 15" jigsaw has power takeoff on motor which drives either buffing wheel, sanding disk, grinding wheel, or flexible shaft with wide application of cutting heads. Compact size means no storage problem. For additional data, write Dremel Mfg. Co., 4915 21st St., Racine, Wis. 53401

World Engines/Sky Knight sport RC. Designed to operate with compact full-house RC systems, ARF kit uses engines in the 30 to 40 class. Beautiful pre-finished fuselage, wings, tail, even pre-hinged rudder. Pitot-line Sky Knight is 42" long, has span of 51", wing area of 650 sq. in. Can be carried "all-up" in most car trunks. \$49.95. World Engines, Inc., 8960 Rossash Ave., Cincinnati, Ohio 45236



K & B Mfg./40 engine. "Series 71" Torpedo 40 RC engine now available with built-in fuel shut-off to conform with AMA rules for Formula 1 flying. Still features other characteristics of standard Torpedo "Series 71": Squish-band head, extra deep fins, aluminum piston with single "no-tension" ring. \$35. K & B Manufacturing, 12152 Woodruff Ave., Downey, Calif. 90241

Kavan/Unusual 61 engine. One of the highest performance engines on the market, Kavan 61 uses Schnuerle-type scavenging. Large fins provide cooling. For RC with rear-mounted carburetor. For additional information, write Franz Kavan, Lindenaststrasse 56, 85 Nuernberg, W. Germany



Gullow/Hawker Typhoon. Flying scale model of RAF attack aircraft of WW II. 18" span, ample wing area and dihedral make flights to 100' possible. Special lightweight plastic cowlings and canopies make all planes in this series look more realistic without adding excess weight. All-balsa built-up construction, colorful insignia sheets. \$1.30. Paul K. Gullow, Inc., Wakefield, Mass 01880

Mini Flite/RC trainer. Unusual in appearance "Square Bear" is ABS plastic ARF kit which is designed to operate on small full-house RC systems. Excellent handling characteristics for the beginner, plane can be converted from taildragger to trike gear by reversing the main gear and adding 1/8" gear. For 19 and 30 power. Available in December. Mini Flite Co., 48 Princeton St., Red Bank, N. J. 07701



Fliteglas Models/Gladiator. 60-powered fiberglass fuselage, foam core wings, and design inspired by Navy strike aircraft make Gladiator an outstanding value at \$60. Kit contains fiberglass fuselage (16 oz.), foam wings with fiberglass tips, balsa, detailed plans. 68" span, wing area 730 sq. in., flying weight, about 7 lbs. Fliteglas Models, Box 98851, Des Moines, Wash. 98188

Tern Aero Co./Flying Model Series. "Gone Goose," rubber-powered for indoor/outdoor flying, span 17 in., \$1.50. "Starduster Sportplane," inherently stable high-wing parasol with clean lines for sport flying, span 16 1/2 in., \$1.75. Both kits contain high-quality balsa strips and sheets, Jap tissue in two colors, 6-in. plastic propeller, plastic balloon wheels, Dextrin self-lubricating plastic propeller, and 1/8-in. rubber for power. "Traveler Sailplane," \$1.50, is 24-in. graceful flying towliner. Balsa strips and sheets, Jap tissue in two colors, predetermined nose balance weight, hardwood tow hook, wing attachment dowel, plastic for cabin windows. Tern Aero Co., P.O. Box 66398, Chicago, Ill., 60666



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wing cutout to the wing so it won't be too large. The top half should now be complete except for the engine cutout and cockpit.

Return to the bottom half and carefully drill four holes for the wing hold-down hooks and two holes for the landing gear. Cut out for the tail skid hardwood block. Now you have reached the point you would have been if you could have purchased a Fireball kit. If you have made it this far, it's all down hill from here.



This is about how the kit would have looked.

Glue the hardwood engine mount into place, making sure that you have inserted the engine hold-down bolts first. Now cut two 3/8" dowels 1 1/2" long, drill a 3/32" hole through both, and split them lengthways. Bend and insert the landing gear wires through the fuselage, insert the wire ends into the brass tube, apply glue to the dowels and slip them down into the fuselage around the landing gear wire. Install the tail skid wire and hardwood block. Insert the wing hold-down hooks using split dowels as you did with the landing gear. The hardwood bellcrank support can now be cemented in place. Glue four dress hooks in place to hold the stabilizer in position. Landing gear fairings can be added if desired. Use 3/16" sheet balsa. The addition of a canopy and rudder to the top half of the fuselage will essentially complete this phase of construction.

Cut the stabilizer from 1/8" sheet balsa. Note that the front of the stabilizer is reinforced with a piece of 1/8-in. sq. spruce. The two elevator halves are glued to 1/8-in. sq. spruce. Add the 1/8-in sheet doubler to the bottom of the stabilizer. This will keep it in alignment with the fuselage. Drill two holes in the trailing edge of the stabilizer for two grommets. The rubber bands that hold the stabilizer in place will pass through these grommets. The addition of the elevator horn and cloth hinges will complete the stabilizer.

The rudder is cut from 1/8 in. sheet balsa. Sand to shape and cement to the fuselage top, being sure to offset the rudder to the right.

Note that the 1/16 in. wing skins are not identical—the top skins have more cord due to the airfoil shape. Cut out two top wing skins and two bottom skins. Mark rib locations on the bottom skins. Pin these to a flat board and glue the ribs in place. Block up the leading edge with scrap balsa. When they are dry, remove them from the building board and taper the edges with a sanding block. Apply glue to the rib tops and edges and set

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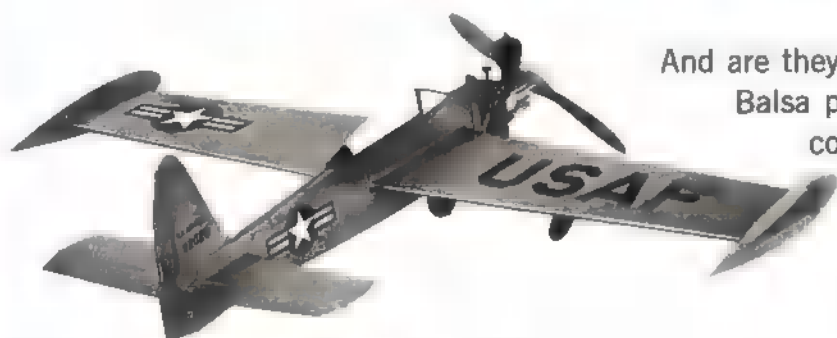
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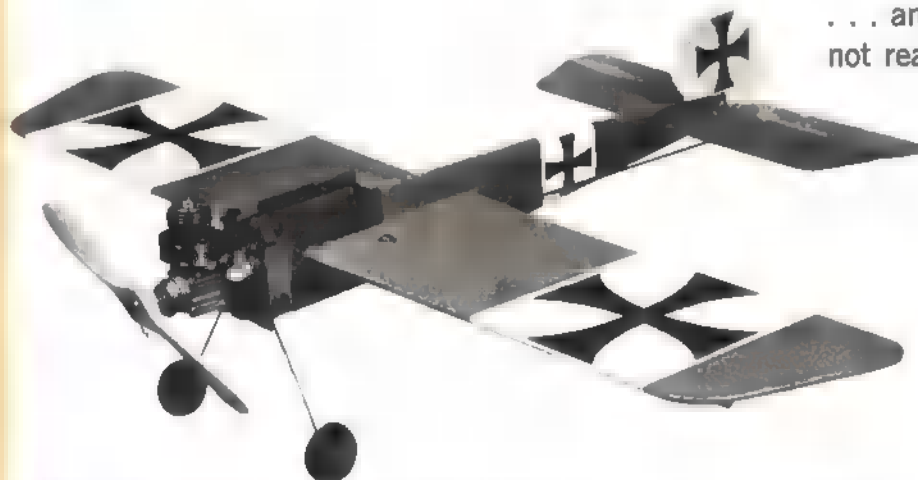
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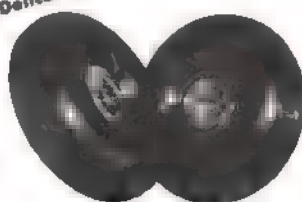


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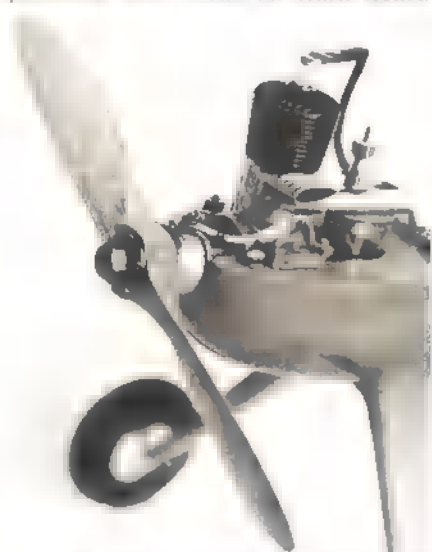
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the top wing skins in place. They can be held together with masking tape. When dry, sand each half to shape. Sand the center ribs to make the dihedral angle. Glue the two halves together. Wrap a three-in. wide piece of open-weave cloth around the center section



True to its age, the engine is an ignition O&R 23. Tiny gas tank gives very long flights.

and glue into place, working the glue through the cloth with your finger. Sand the entire wing again. Then add the lead-out guide to the bottom of the left wing.

Final Assembly

Add the ignition system, bellcrank, control horn, and pushrod. The wing is held into place with rubber bands as is the

stabilizer. The fuselage top can be held to the fuselage bottom with rubber bands or screws. The engine is set in place and the top fuselage cut to clear the engine cylinder and exhaust.

I have tried to show you how the Fireball was made. If you are a purist and want to build it the way we did thirty years ago, it must be made with cellulose glue and dope. After all, that's all we had back then. If you wish to improve the old model, then I would suggest using Titebond glue and epoxy.

If you decide to go modern all the way, you can use a good glow engine, commercial bellcrank and elevator horn. Because of the increased power produced by modern engines, it would be wise to consider gluing the two fuselage halves together making a one-piece airplane.

Some of you may remember the Fireball, but not as I have drawn the plans. This could be true, as after World War II a second version was kitted. The basic change was a lower profile fuselage top with a bubble canopy—the only change made, to the best of my knowledge.

Good luck with your Fireball and keep the antiques flying!

Blue Ribbon Review

(continued from page 42)

required. Don't expect the Jerobees to handle the rough parking lots where larger model cars handle the bumps. If your racing surface is rough, add weight in the form of lead bars taped to the chassis. The bouncing will be reduced at total weight of about three lbs., but acceleration suffers.

Construction: The cars are indeed rugged. The body will not shatter under the impacts expected from an inexperienced beginning driver. The body mount is a clever hinging system—the hinge pin may exit from the molded hinge slot only when the body is lifted all the way forward. Hence, the body is easily removable.

The roll bar was the only part that fell off the cars during testing, so don't pick up your car by the stock roll bar! Sooner or later it will drop. The antenna tube was not completely satisfactory. Be careful to secure the tube in the chassis every time you remove the body. A coat of valspar will protect the decals during normal usage. Note that for decorating the body, other than the supplied decals, MonoKote works well, as evidenced by the Jerobee McLaren model in the photos which was detailed with MonoKote.

The addition of a brake (as shown in the photos) is a worthwhile modification, for it makes the car easier to drive and is a valuable safety feature. In the near future Jerobee will be offering a similar brake as an accessory.

A right-handed owner should take special precaution when starting the motor because

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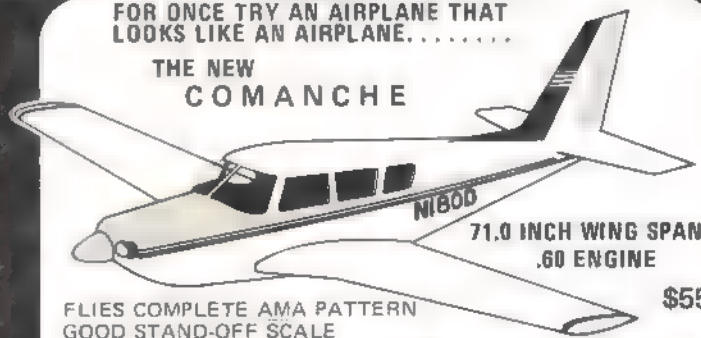
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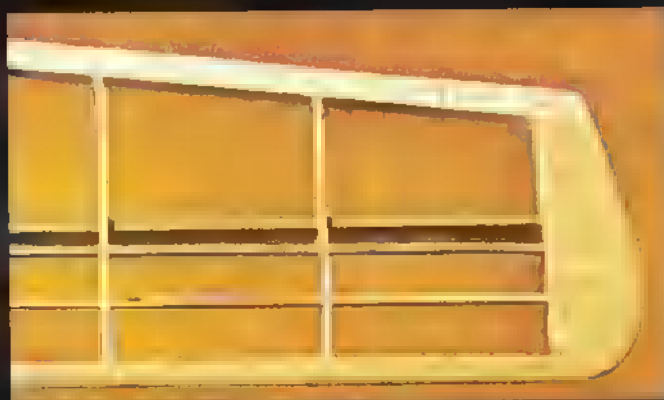
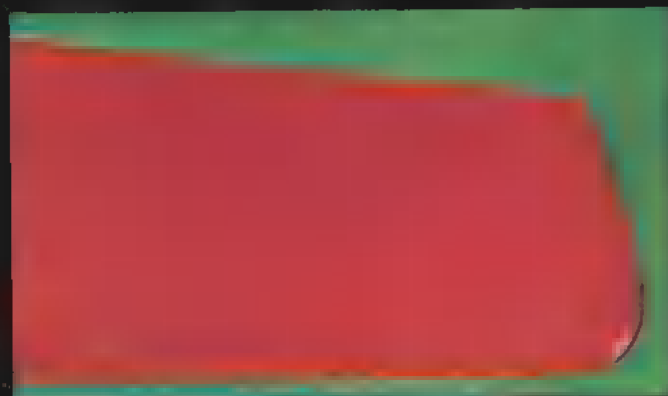
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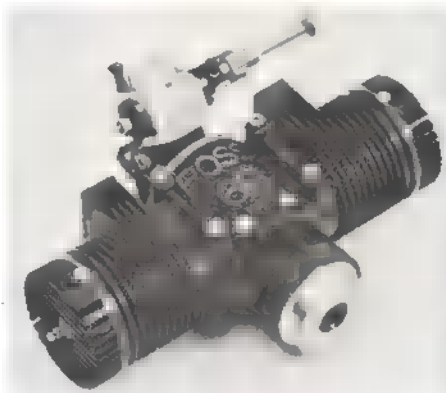


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of the pull-chord starter. It is easy to cut your finger holding the pull-chord knob since the adjacent castings have sharp edges. (This is being corrected, we are told.)

Driving Impressions: The transmitter fits nicely in the left hand and is comfortable. The trim lever for steering is in the center of the wheel and is easy to adjust even while driving. Mechanical action of the steering wheel is smooth. The car is surprisingly fast and will tax the skill of any driver without being too sensitive for the novice. The transmitter layout helps in the learning process.

The Jerobee product uses a license-free under-100-milliwatt transmitter. The operating range is less than we have with the 1/8 scale cars equipped with high-powered radios. Because the 1/12 scale car is smaller, one can't actually see the model at a distance further than 200 ft. and therefore effectively drive it. The range suits the scale.

In order to avoid driving out of range, it is advisable to establish the range limit for your Jerobee car and mark your regular driving site to keep within this distance. If this is done,

the Jerobee radio is quite suitable for use in a 1/8 scale car—the servos are certainly powerful enough.

To compensate for this limited range is the fact that a smaller car can do much more racing in a confined area than a larger car. A 1/12 scale car with a high-powered radio driven on a track for 1/8 scale cars looks awfully small at the far corners. Sweeney's prototype looked silly racing beside the 1/8 cars and could be driven flat-out all the time because corners for the 1/12 model seemed large; for the 1/8 models they were tight.

The Jerobee models have been well-accepted around Washington, D.C. When you find another Jerobee car driver, get a club started. Don't try to horn in on the 1/8 scale modelers. Remember, you don't need their huge parking lots and the 049 is much quieter. In fact, your Jerobee cars could be driven in a large indoor site if you can find one. Next year Jerobee will begin introducing some accessories. Look for racing tires, brakes, new bodies, hop-up parts for the engine, heat sinks for the cylinder head so it

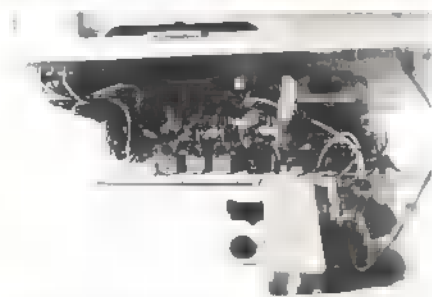
can handle high-nitro fuels, etc. A hopped-up Jerobee is frighteningly fast.

Plans are developing for an association for RC car racing—by either associating with ROAR (Radio Operated Racing Association) or by forming a separate association for these smaller models with the low-powered radios.

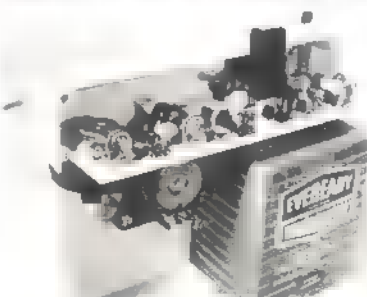
In all probability, the hobby market aspect of 1/12 scale cars will develop following wide use of the Jerobee product. The Jerobee radio will certainly find other uses too.

We don't know if it will fly a plane; we doubt it. However, it could guide a small boat. Perhaps a license-required version of the transmitter could be used in a plane. All this is for the future. Kids who have started in RC with a Jerobee car will probably become hobbyists—the car is too unique and challenging for just casual take-it-or-leave-it use.

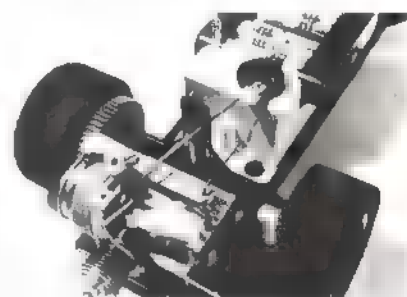
Meanwhile, for the toy market here is an exceptional value at \$109.95. It should develop new hobbyists and modelers and afford much enjoyment.



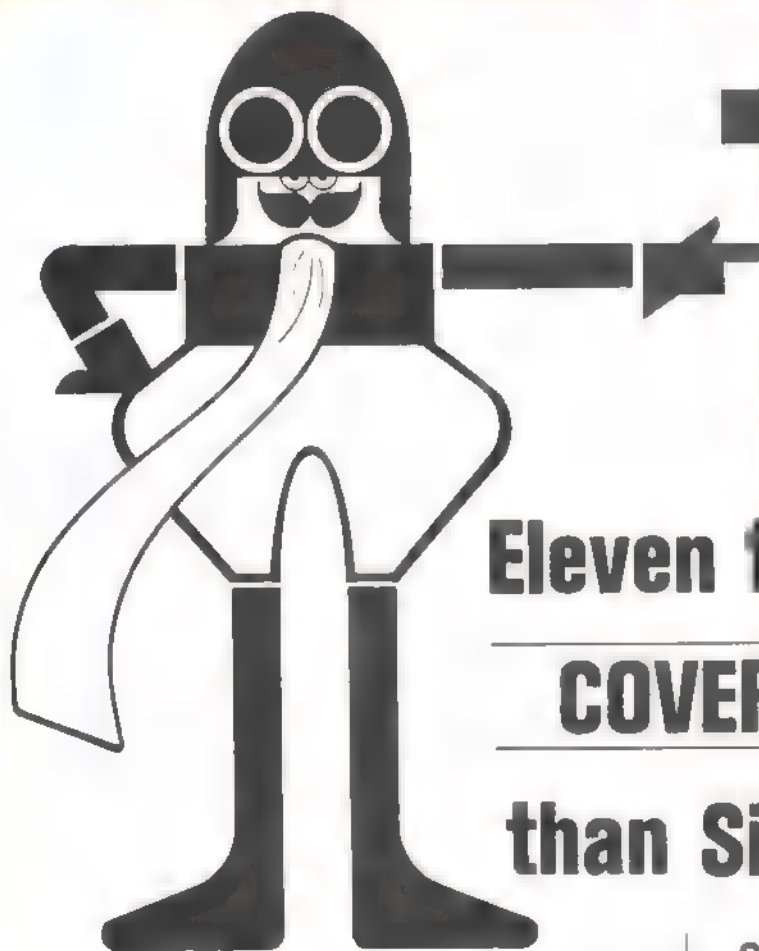
One PC board handles all components of the receiver/servo unit. Servo mechanics are from E.K.'s multi-digital systems, tiny and durable.



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Homemade brake is stiff brass pivoting on screw beside pull-starter and bearing on clutch. Note link to servo.



11

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Brooklyn Dodger (continued from page 17)

accepted — not quite enough for good performance. The Forrester 29 was the one most accepted; for sport flying either of these plus many others will work well. I have been using the Vivell 35 because they are quite common and easy starting. In fact, there should be quite a few new or near-new available. Precaution should be taken if you are venturing into the ignition engine field for the first time. There are a lot of good engines available and good guys who will help you. However, beware of what is known as the horse trader. Parts are around for most engines, but be on guard against the engine without points.

When planning your engine mounting, 29's-and-under perform well with a little left thrust. The 35 needed about five degrees left. The fuel usually used by most old-timers is three parts white (unleaded asoline) to one part SAE 70 lubrication oil (available at motorcycle repair shops). For new engines castor oil can be added for better lubrication, and to preserve the engine a little better. Either can be added — contests for easier starting and a few more rpm's. Modern fuels will ruin your engine unless it has been converted to "glow." Should you desire to put in a glow-type engine, a standard 15 will be more than enough and a hot 09 will do a good job.

The competitive builder, picking his wood, can keep the weight to about 26 to 27 oz. The Vivell version shown came out at 30 oz. The weight of a glow version will be much less and every effort should be made to keep the back portion of the plane as light as possible. A lot of things make a plane fly and a light plane can make some poor designs fly; however, nothing can make a heavy plane fly well. As a very general rule the following helps as a starter: short motor run (10-15 sec.) glow-type free flight should be seven oz. per sq. ft. of wing area — less (for this model it would mean a total weight of 23 oz. or less; the 20 to 25 sec. motor run for ignition-type engine should be 11 oz. per sq. ft. or less (or 27.5 oz. or less); in the case of the "C" version, which means a heavier engine, nine oz. per sq. ft. or less (or 29.75 oz. or less).

There are many lighter planes per square foot of wing area that are floaters and there are glider types that are heavier per square foot, designed for penetration. These are only meant to be guidelines to start with, and will produce respected planes that can be competitive and the top performing sport type. One thing most everyone agrees on is that sandpaper helps the plane fly better! So shape and sand all parts as shown on plans.

Construction

A good flat working area (approximately 30 x 45") with a Celotex or similar top, pins, a few rubber bands to use as clamps, X-acto saw, some sharp blades and you are ready to go. Your plans can be protected by a waxed paper covering. Use whatever glue is your favorite. I used Ambroid because it would be more compatible with Silkspar and dope. Water-base glues are good also, especially if you plan to MonoKote.

Cutting out parts accurately is well worth the extra time spent. Parts that don't fit look badly, are structurally weak and waste time trying to make do. I like to cut a little at a time, mostly while the glued parts



Dodger was a Sal Taibi design whose recommended engine was an ignition 35. A 19 would be a glow equivalent.

are drying, so I don't get tired of cutting and become careless.

This is a fun design. Crutch-type construction is one of the quickest, but demands that you start right. The key is to build the crutch first, being very exact. When thoroughly dry, all formers can be added, making sure they are perpendicular (90 degrees) to the crutch. The top and bottom longerons can now be added. Recheck alignment again and put in stringers, cabin top and engine mountings. The cowl can be made from a solid block or built up as desired. Follow the plans for dowel placements and landing gear. The timer, battery coil and condenser areas used are shown. These were established after the model was complete to prevent adding any weight to the nose or tail. There is plenty of room to shift weight around, — I would suggest the same for you. The only modern changes made to the fuselage were wrapping the coil and batteries in foam instead of anchoring solid, and adding the DT fuse tube.

The undercambered wing is of standard construction and aerodynamically the same as the original. I used and recommend using spruce spars. I also used larger gussets and placed them flush with the top of the rib—to strengthen and minimize warps, and particularly to help stop the common downward warping of the trailing edge that is hard to prevent on undercambered wings. The angular-type reinforcement at the dihedral and polyhedral joints is something I have been doing for many years and I do not understand why more do not use it. Spar bracing helps—adds tremendous strength, because of compound bracing, and holds down warping.

The sequence I used for building is as follows. First layout leading, trailing and tip edges, then glue in ribs. When dry, glue in bottom spars using shims or wedges to hold in place (made out of scrap), then add ribs and top spars. Add bracing and dihedral and be a little modern by taping and epoxying the joints. Sheet in center for strength when hold-down rubber bands are attached.

Stab and rudder are as shown on plan. The only precaution I use in elliptical-type construction is making sure all joints match and are well-glued (one of the best safeguards against warp). Spars should be shaped ahead of time to give good sanding guide. Ribs are better oversized, as it is easier to sand off than add on. The plan shows 3/8" sheet used for leading edges—later kits used 1/4" (the latter preferred by Sal Taibi).

After each unit is completed, they are joined as shown. The gap or angle allowed for the DT is 45 degrees. This is more than enough, (usually 42 or 43 degrees is optimum), but allows for a few degrees of up elevator trim if needed. A stop anchor has

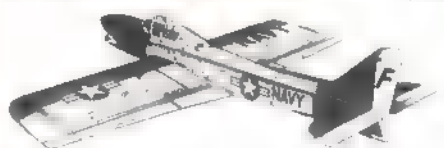
MULTI CHANNEL



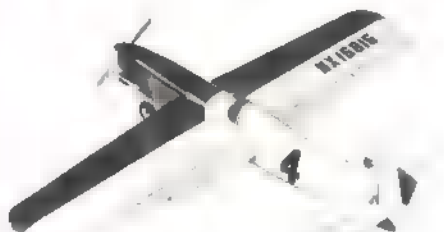
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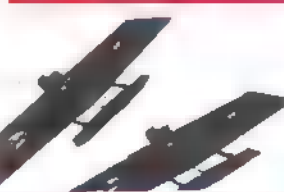
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ACE R/C

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NEW KRD ITEMS

Last month we introduced the KRD Aluminum T Motor Mounts and the Heat Sink and Exhaust Pipes for a Veco .19. This month we are introducing some other new KRD items which should prove of real interest to the modeler.



UNIVERSAL HEAT SINK ■ PLUG

Designed for the Cox ■■■ of engines, this package contains the High performance head and ■ Heat Sink for items like the Sea Bee Boat, and other applications where not enough air gets to the engine while running. Helps keep fuel cool and from boiling. Also saves your engine by avoiding overheating. The Universal Heat Sink must be used with the specially machined plug (included). Plug is also available separately as a replacement item.

No. 16L138—KRD Universal Heat Sink \$3.75 and Modified Hot Plug

JEROBEE HEAT SINK ■ PLUG

This heat sink is used ■ a heat dissipator and is designed to fit the Jerobee series of cars. It has a modified Cox glow plug which will fit all of the Cox series of engines, and ■ if the dimensions are applicable it may be used in other applications beside the Jerobee. The KRD Heat Sink and Dissipator will really take care of excess heat where there is an insufficient flow of air, and keep your fuel from getting hot and bubbling. Measures 3 1/2" long by 3/4" wide by 1/4" thick. Center mount. From these dimensions you ■ tell if you can ■ it in your application. It is designed specifically for the Jerobee cars, but there may be other ■ ■ you ■ fit it into. Will work only with the specially modified glow plug which is included in the combo package. The glow plug is of ■ high performance type.

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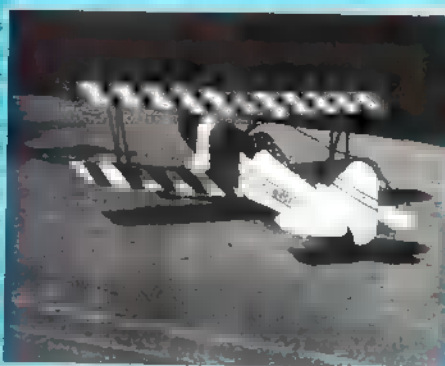
KRD BATTERY CASES AND PACKS

This battery case is especially designed ■ hold four of the new Gould Nicad 225 SCL type batteries. This cylindrical battery measures .650" in diameter, and is .650" tall. As used in this case, it makes a flat pack. The outside dimensions of the flat pack are 1 7/16 ■ 1 1/2 x 13/16". Weight of bare case without batteries is ■ grams. Offered in three versions.

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Dear Friend:

R/C Modelers have ■en having a ball with our Mini Foam Wings—designing and scratch building their own ships.

One is shown above. This is Romey Bukolt's Bipe—patterned after ■ EAA plane. Uses two of ■ taper wing and an unusually easy cabane structure. It is being completely wrung out with both ■ and 3 channel rigs. Romey wants it to be "just so." Knowing Romey ■ ■ do, it will be that way, too. We'll keep you posted.

Our Skampy plans, which use a taper wing for ■ .020 Goodyear type racer, having been enjoying a boom. This Kampen design ■ unlike many planes of this type—transition from flight to glide must be seen to be believed.

We're making a special offer right in this column. Order ■ catalog No. 13L266 for \$2.95—and we'll ■ you ■ set of taper foam wings AND a free ■ of Skampy plans. Offer is limited.

Fred Reese has ■ up with a Sopwith Triplane, using three of our constant wings. Normally, you'd expect a Triplane to be hard to build, but Fred has some ideas to really ■ ply it. Scheduled for publication in early 1972 in RCM.

Comments are pouring in on our Ace High kits; its general appearance and go-together-ability; plus its extremely good flying characteristics. Very heartwarming.

In 1971 we introduced three Mini Foam Wing kits. Our plans for 1972 include ■ more of the ■ high caliber. Just keep watching our ads for announcements on them. We won't advertise prematurely! We ■ also going to make more Rudder Only PLANS available.. built up jobs, as well as foam wing ships.

With 1972 just around the corner, we'd like to express ■ you our deepest appreciation for making this past year ■ great one for Ace. ■ will try to continue ■ merit your approval.

Several great new items ■ ■ announced soon! Stay on ■ frequency!

Yours sincerely,
Paul F. Runge
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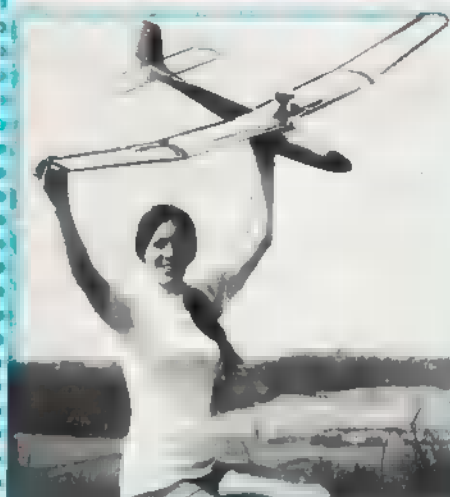
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Parts for power pod are included (Cox ■ Bee .049 recommended). Those living in the soaring ■ of the country can leave off the power pod and locate hooks for high start or tow line launch.

The kit also contains step by step assembly details, matched foam wing sections, hinge material, torque rod and link parts, nylon tubing, and installation hardware for Rudder-Only Pulse Commander. (Standard Commander 10G16 recommended).

Extensively test flown for well over two years.

No. 13L104—Ace High Sailplane Kit \$14.75



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This kit of the Dick's Dream, designed by Owen Kampen, has been extensively test flown in various parts of the country. It has several innovations which are for the small breed of airplane specifically, and with the foam wing the beginner ■ assured of overcoming ■ big drawback to success. Features crutch type fuselage construction to assure line-up and accuracy.

Full step by step instructions to assist in building this gem of ■ kit. AND ultra simple installation shown for the Commander R/O Baby or Baby Twin!

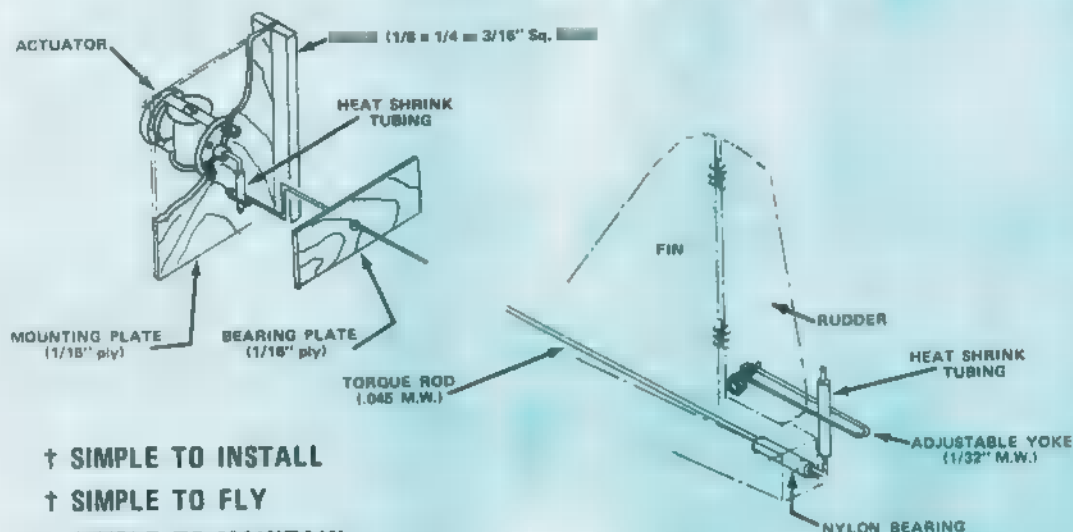
Span is 34" (cut from the Ace taper wing foam sections), 5 1/2" chord, length is 25 inches. Weight with R/C gear is 12 to 14 ounces.

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No. 13L100—Dick's Dream Foam Wing \$5.95
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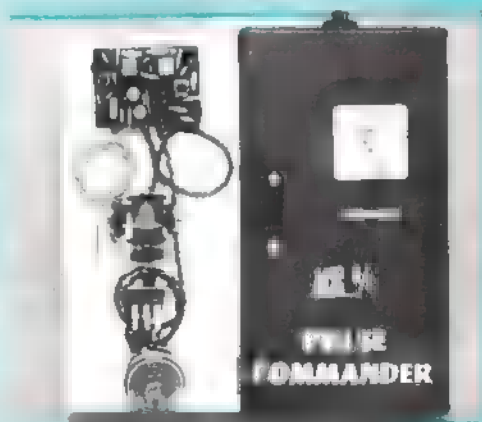
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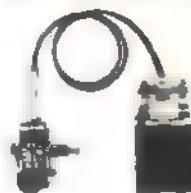
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(continued from page 66)

been incorporated on the DT because the unit may overpop — this type of design even though there is a stop. Enough rubber band tension should be used to just slightly lift the unit in a parallel position. Make sure the keeper band around the fuse holds the tail pops to safely drop out of a thermal. This can be hard to adjust, as a slight movement will not get the plane out of a strong thermal. Therefore, I try to allow the plane to come down with as much speed and as steep as I think it can structurally stand at impact. Usually a steep drop with a slight spiral is preferred. To save the plane, I like to short fuse during trim flights as well as short motor run. I have seen many make a short motor run test and lose their plane out of sight because the DT wasn't adjusted.

It is quite a problem today to choose a covering, there are so many. The originals used Silkspan and bamboo paper. Silk is a bit stronger and Jap tissue is a bit touchy if you get it. MonoKote-type coverings have been accepted in most Old-Timer meets. I was able to find some old colored Silkspan, and so I used that. The trim pattern in the pictures is the same as the original and the color was white with red trim.

Flying

The center of gravity — not called out on the original, but it has been generally accepted to be 50%. As with most Old-Timers, adjustments during test glides — very important. Always glide with the nose slightly down and try to be at flying speed—a pretty good run. I prefer to ROG old-timers, advancing the throttle only enough to get it up. I then advance throttle a little each test while make thrust first and then trim adjustments.

Please remember to light the fuse so you do not have a fly-away. This has been one of the great Old-Timers and hope you enjoy it — much as I have.

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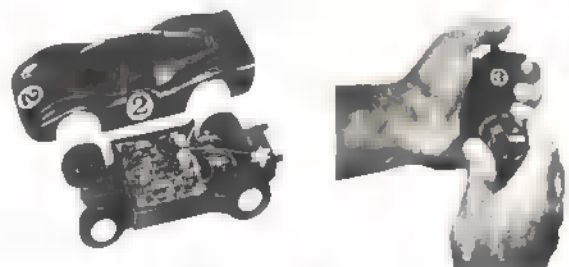
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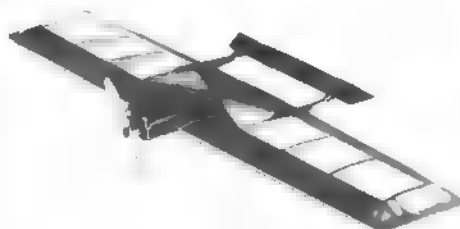
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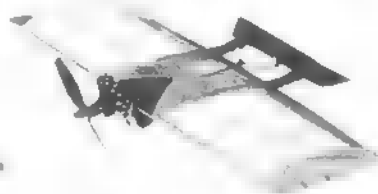
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Canus

(continued from page 20)

bulkheads in place, predrill as many holes as possible for Tatone mount, nose gear, pushrods, etc. Glue all F bulkheads in place (except F-1). Install fuselage sides to F bulkheads. Place a small piece of waxed paper between fuselage sides at rudder lower hinge location. Install F-1 and lower nose blocks.

Next, glue in place T-1, T-2, T-3 and the two T-4's. If you have one of the larger size radio systems, as I have, place a 1/8" balsa platform between T-2 and T-3, as shown on the plans. After fuselage is completed, the 1/16" balsa crutch can be removed from this area, and you have a deeper receiver-battery compartment. Plank this area with 1/8 x 1/4" strips, butting them against F-1. Sand smooth and trim ends at T-3. Glue on remaining T bulkheads, 3/16 x 1/2" strips, 3/32" sides and finally the 1/2 x 2" balsa plank.

To complete the upper structure, glue two blocks onto the fuselage with a piece of scrap 1/4" balsa (wrapped in waxed paper) between them to represent the fin. Prepare a block of balsa for the hatch cover and you are ready to carve and sand to shape. Now cut engine hole, glue in wing hold-down blocks, cut stab slots in doubler, etc.

Next step is to locate wing on fuselage. Mark dowel locations on LE of wing through dowel holes in F-3, which should be 9/32" in size. Mark location of hold-down bolts on hardwood blocks. Install dowels and drill hardwood blocks with a No. 10 drill and tap with a 1/4 x 20" tap.

If you have not tried Super MonoKote, give it a try; it's not as hard as it would seem. Each roll comes with a good set of instructions. It's a very quick way to get a good-looking, smooth, fuelproof and waterproof finish. It is also much lighter than a silk and dope finish.



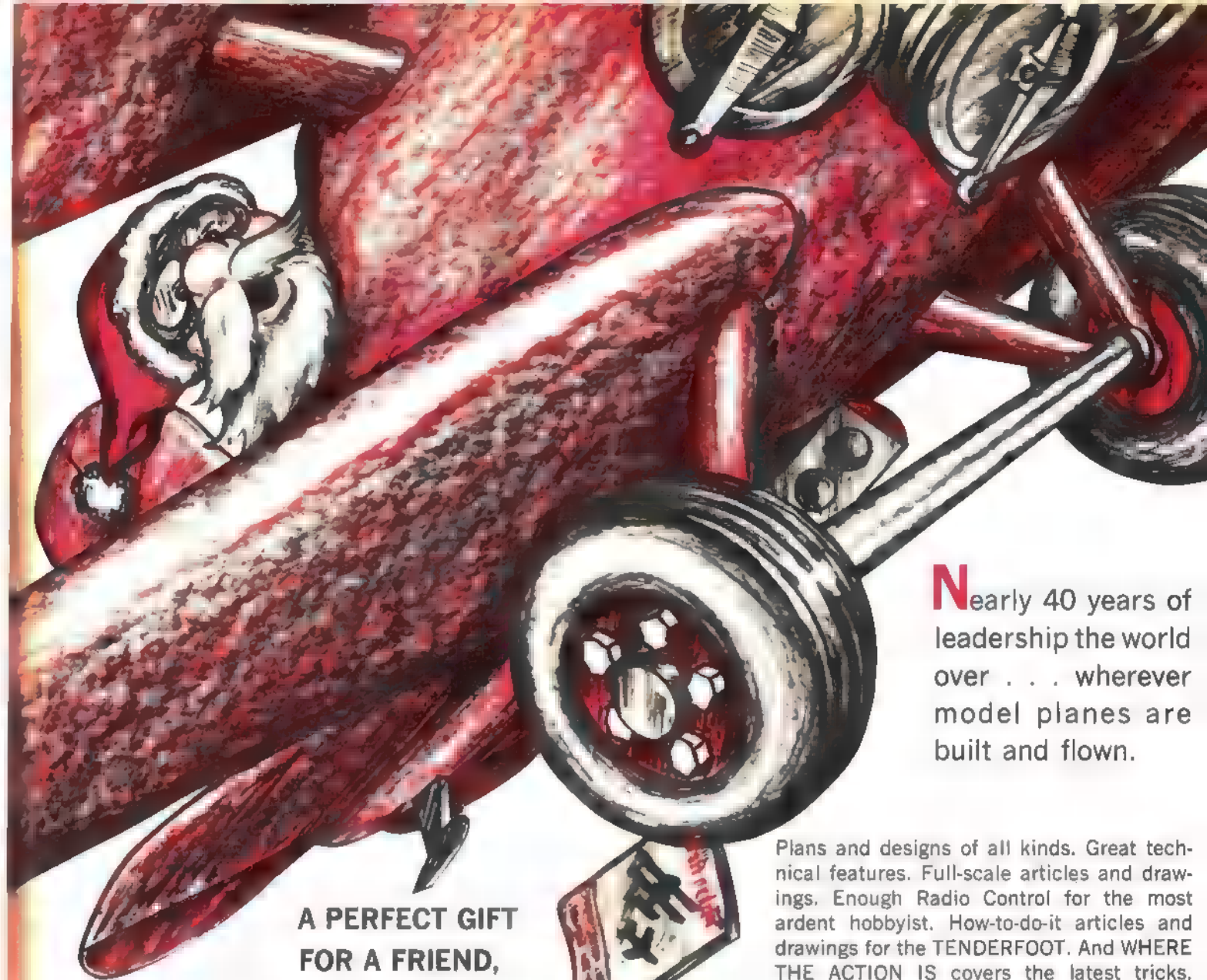
Wing cores with landing gear blocks installed. Note use of LE and TE spars. Edges of servo cut-out already planked.

Sand the entire model smooth with a fine grit sandpaper. No primer or sealer is needed for Super MonoKote. Fill all cracks and dents though—the Super MonoKote finish is only as good as the surface it is covering.

If this is your first attempt at Super MonoKoting, read the instructions and cover the wing first. This will give you some smaller pieces that can be used for ailerons, tip plates, stab, elevator, fin or rudder. After all those have been covered, you should be ready to tackle the fuselage which is a little harder.

Start the fuselage by covering the bottom area from wing TE to rudder. Cover only to the corners, not around onto the side area. Next, cover the front side of T-5, which would be the pilots headrest area. Make sure that the canopy vent hole is there!

Now the big step. Place a sufficiently large



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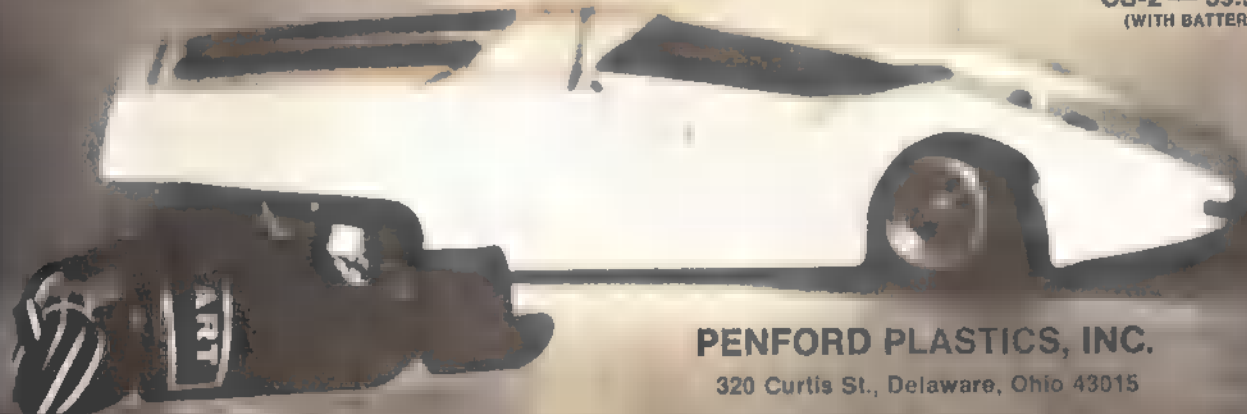
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piece over the top of the fuselage, making sure it will cover the entire length and down around to the bottom. Tack and then seal the Super MonoKote down the top of the fuselage from T-5 to the back end. Work it down around the sides and just overlap about 1/4" onto the previously installed bottom piece. Cut carefully in the cockpit area and wrap it just over halfway around the nose area top and bottom. Repeat with the other side, but stop on center of nose area top and bottom. A 1/4" or a little more overlap is good.

In the wing and hatch openings, run the covering in about 1/8". Cover the hatch and you are almost done.

Final Assembly

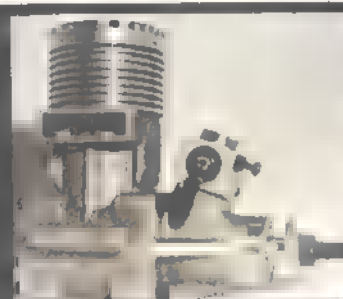
Cut slots and hinge the ailerons to the wing. Stand the wing on end on one of the tip plates and carefully cut around the tip of the wing. Remove the piece of Super MonoKote from the tip plate and glue to the wing. Formula II Hobbypoxy makes dandy little fillets around a joint such as this—same applies to the fin and stab joints.

Now with the wing bolted to the fuselage, custom fit the small block of balsa that fills in the remaining opening in the fuselage. Remove some Super MonoKote from the wing TE and epoxy in place. Cover the block and the wing is finished.

Hinge the elevator to the stabilizer and locate in fuselage slot; remove the Super MonoKote from center section and glue in place. Repeat with fin and rudder.

To mount the pilot's head, cut off his shoulders, fill in the nick with balsa, and use 1/4" dowel to pin him to the fuselage.

One method of attaching the canopy to the fuselage is as follows. Trim the canopy to fit, drill 1/16" holes about 3/16" apart around the edge of the canopy from about mid-point between T-2 and T-3 to T-5 and over the top. Drill the holes about 1/8" from canopy edge. Clean off the burrs and hold in place on the fuselage with a rubber band. Now, using a prick punch, punch holes through the Super MonoKote in each of the drilled holes in the canopy. In the forward-half of the canopy where there are no drilled holes, prick-punch the Super MonoKote right at the edge of the canopy



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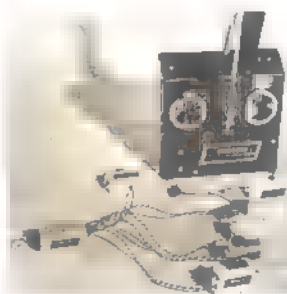
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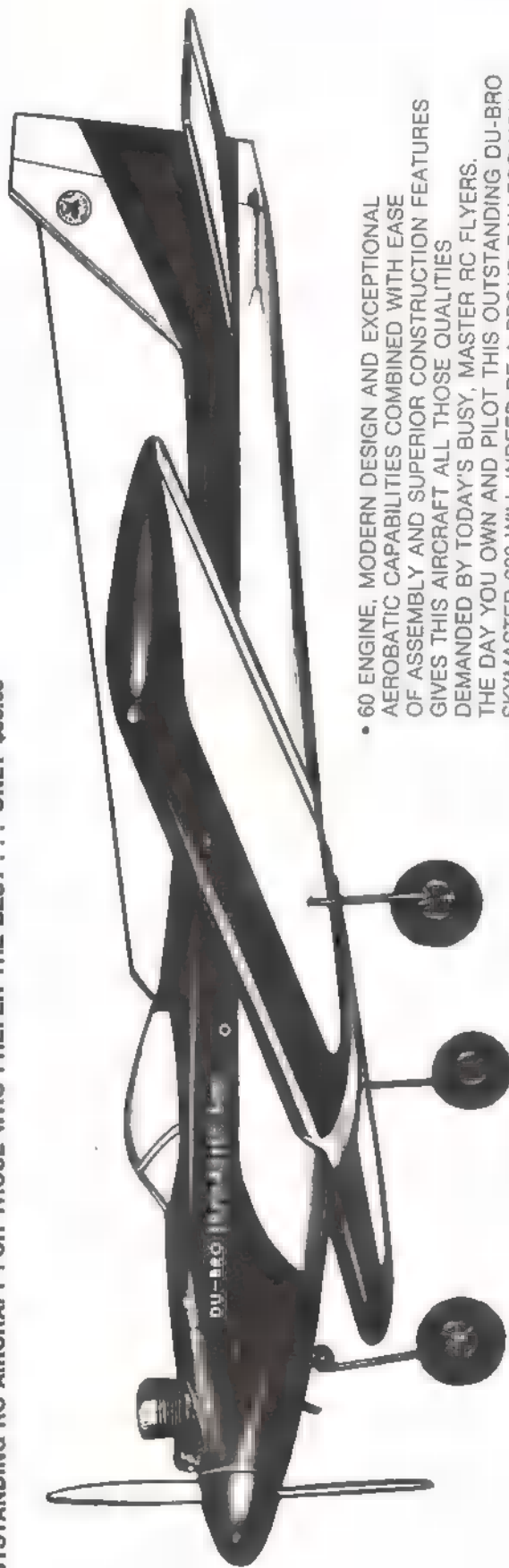
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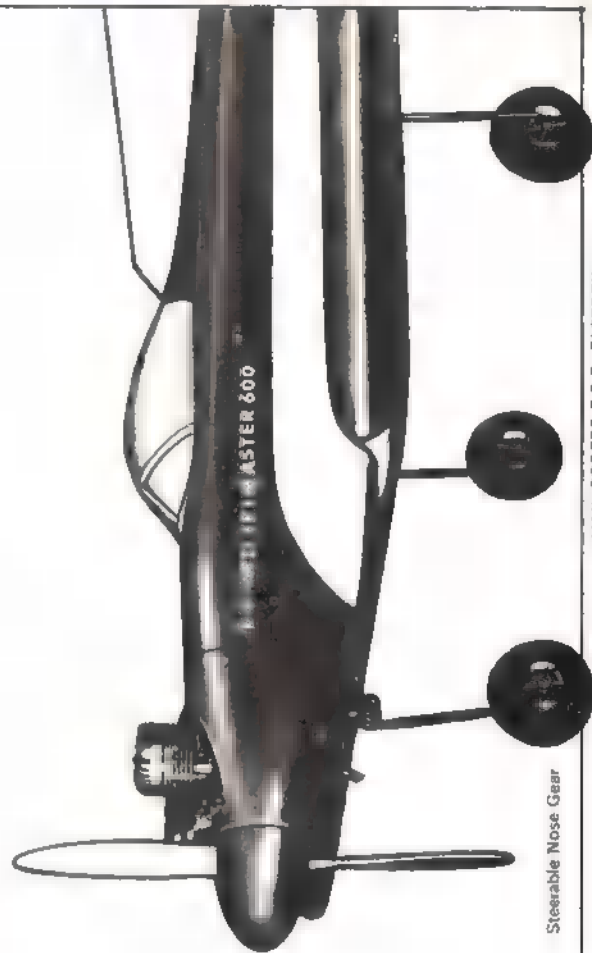
WING

SPAN 62 1/2"
CHORD AT ROOT 1 1/4"
CHORD AT TIP 8 1/4"
AREA, TAPERED 610 sq. in.
CURVE SYMMETRICAL
FOIL, PERCENTAGE AT ROOT 18
FOIL, PERCENTAGE AT TIP 18 1/2
CORE HEAT MOLDED FOAM
SPARS FULL LENGTH, MOLDED IN
SUB SPARS ON MOLDED IN SPARS
SUB SPARS AND JOINER UNITS IN
TRAIL EDGE, 9/16" SLOTTED Balsa
TIPS PREFORMED A.B.S.
COVERING 010 EXTRUDED A.B.S.
COVERING, PRESSURE APP. HEAT SET
AILERONS PRE SHAPED, SLOTTED
ATTACHMENT, LEAD EDGE, DOWEL
ATTACH, TRAIL EDGE, NYLON BOLTS
CENTER SECTION SADDLES FURN.

FUSELAGE AND TAIL ASSEMBLY
LENGTH OVER-ALL 52 1/2"
FUSELAGE COMPLETELY ASSEMBLED
FUSE, HEAT ■ PRESSURE FORMED A.B.S.
INTERIOR, HAND FITTED PLYWOOD
FIREWALL 1/2 PLY
FUEL TANK PLATFORM INSTALLED
SERVO RAILS FURNISHED
EXTRA WING CRADLE DOUBLERS FURN.
ROD GUIDE BASE STOCK FURNISHED
STABILIZER, 2 1/4" ■ 1/4" Balsa
FIN HEIGHT 9 3/4"
ALL TAIL PARTS HINGE SLOTTED
NOSE COWL, ■ PC. PREFORMED
CANOPY INTEGRAL WITH FUSE.
CONTROL ROD OUTLETS MARKED
WING BOLT ASSEMBLY HOLES ■
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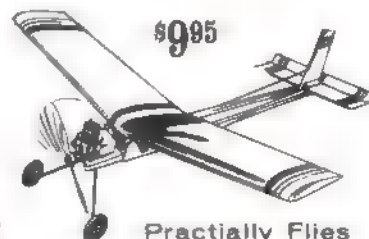


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by itself!

commercial lubricant into the rubber ■ that it appears moist. Slip the rubber into the hooks with the knot at the front.

Observe the model from the rear to check for warped wings or stabilizer. The trailing edges should be parallel to the leading edges of each surface. Small warps will probably be tolerable, but large ones should be reduced or removed. Hold the wood between the thumb and forefinger, then pinch and bend opposite the warp. Apply the process over an area rather than in one spot. If a warp is persistent, one of the regular, fast-drying model airplane glues can help remove it. To bend the wood down, rub a thin layer of glue under the area. If the wood needs to be bent up, rub the glue above the area. Hold the wood in the bent position while the glue sets. The rear part of the fin should be bent to the right about 1/32" to produce a right turning tendency.

This will counteract the left turning effect of the propeller.

Flying

Test fly Yako over the softest area you can find. At ■ San Diego flying site that means picking the spot where the rocks are smallest! Select a time when the air is near calm such as early morning or late evening. Wind the motor by turning the prop counter-clockwise about 100 times. Launch Yako with flying speed slightly nose up and just to the right of any wind. The model should climb at a shallow angle with little or no turn.

Learning the correct launch speed may require some practice. If launched too fast Yako may zoom up and stall; if launched too slow it will dive. If either condition persists small adjustments can be made on the sta-

bilizer. (It is assumed that the wing and stabilizer angles and the model balance point were checked during construction.) The outer part of the stabilizer can be bent down to correct dives or up to correct stalls by the methods described to remove warps. Any sharp turning tendencies should be countered by bending the rudder opposite the turn.

When the flight pattern is satisfactory, put more turns into the rudder and observe closely as models often require additional trimming under the higher torques. The number of turns that can be put into the rubber depends upon its quality. Most motors will take 300 hand turns. When fully wound our Yako climbs steeply, then rolls into a climbing turn to the left. As the torque lessens, the model flies nearly straight then glides in a large right circle. Occasionally we use a long motor—perhaps 18"—and stretch it out and wind it with a winder. With such power this model has climbed to surprising heights. If Yako seems sluggish, it may be due to low torque rubber—try a larger size. Keep the prop shaft and bearing well-oiled.



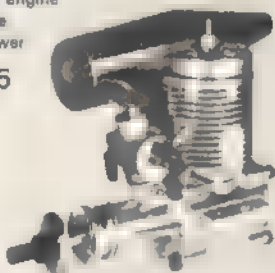
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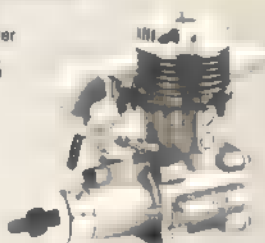
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Last Bipe Fighter

(continued from page 23)

little biplanes from Long Island. War clouds were gathering, but America knew it ruled the Pacific, and paid little attention to the stories of fast, maneuverable fighters with which Japan was sweeping across China. The first monoplane Brewster Buffalo bowed in with the fleet in December, 1939, when war was still two years away; honors for the first change from biplanes went to the U.S.S. Saratoga's VF-3 squadron.

Little by little, the replacements came on board to relieve the old-timers of their proud duties. F4F-3 Wildcats shoved the rest of the F3F's out of service in late 1940 and early 1941. An airplane with a top speed of just over 250 mph simply wasn't capable of performing the important tasks which were then coming into focus. The Buffalo could top 300 mph, but even it wasn't up to the challenge.

The last Navy combat units turned in their F3F-3's in June, 1941, while the Marines hung onto theirs until October, barely eight weeks before the attack on Pearl Harbor. The biplanes then went to training squadrons, where a steady stream of rookie pilots, and then mechanics, methodically reduced them to scrap. The last of 164 airplanes in the series—F3F-2 No. 0983—was removed from the Navy's list of serviceable airplanes in November, 1943. Sad to say, not a recognizable piece of a genuine F3F is known to exist.

Yet, all has not been lost. Three civilian airplanes quite similar to the F3F were built, and two of them are still around. A single-seat Model G-22 became the "Gulfhawk II" for display/aerobatic pilot Al Williams, who flew it from December, 1936 through World War II, demonstrating it before hundreds of thousands. In October, 1948, it was flown to Washington and presented to the National Air Museum, and is now on loan indefinitely to the EAA Museum in Hales Corners, Wisconsin.

A pair of two-seaters were built in late 1938. One was the Model G-32 "Gulfhawk III" NC-1051, which became the USAAF's C-103 No. 42-97044. The other was the Model G-32A NC-1326, which was used as a company airplane until it was drafted in 1942

to become C-103 No. 42-97045. Both served as VIP transports out of Bolling Field, Washington, D. C. until May, 1943, when they were transferred to Miami to be used for training. The first was lost in the Florida Everglades, while the other was returned to civilian ownership after the war.

Ben Bradley, of Ft. Lauderdale, Florida, eventually got hold of NC-46110, completely restored it to Navy colors and had it relicensed N7F. After flying it in air shows for several years, he sold it to Chicago industrialist Bill Ross, who has offered it for sale for \$50,000. Not bad for the nearest living relative to an old biplane.

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Modeler Mail

(continued from page 11)

safety and ease of handling go—Kulczyk's work offers the most easily fabricated fan, as well as a common-sense attitude towards its construction. I am looking forward to similar articles exploring other possibilities.

Lt. T.E. Arnold (USN),
Tra Vinh, Viet Nam

Kudos

I am what you would call an "unexperienced sport modeler" (RC and UC). I have just read your editorial "Straight and Level" in the August issue. The new JR. American MODELER magazine sounds great! You people have my backing on this magazine focusing on beginners in the modeling hobby.

John Gapinski, Niantic, Conn.

I just read about your plans to publish a new magazine, **JR. American MODELER**. I think this is a fine idea, and I hope the magazine is successful.

Younger boys live on my block and whenever I'm out flying my planes (small gliders and helicopters) these boys are almost always cheering me on. I think if they had a good magazine that they could understand and that told them how to build and fly simple model planes, they would have the same keen interest in modeling that I have. I hope JR. American **MODELER** will be such a magazine.

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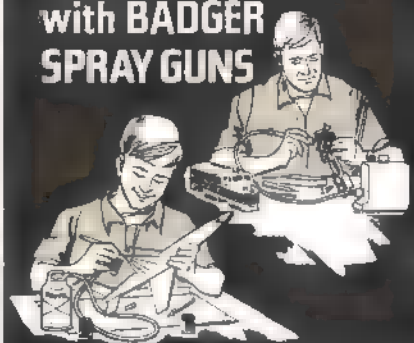
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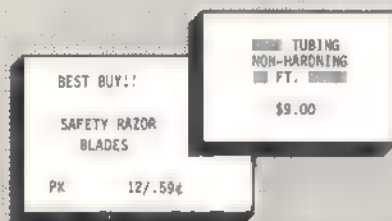
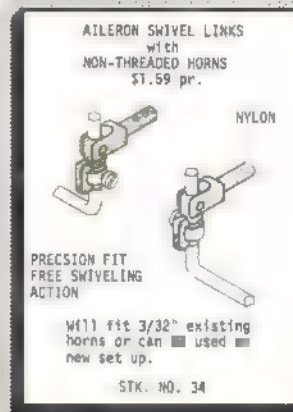
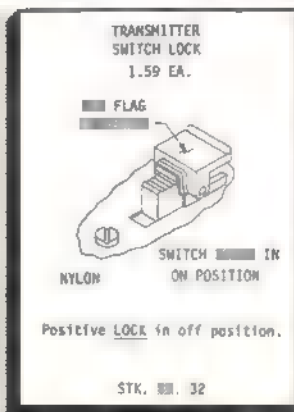
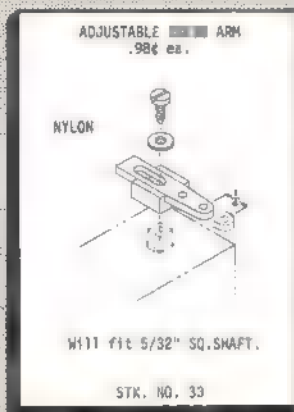
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I had to learn the long way—trial and error. I started with small gliders two years ago, and now am in the middle of a Sterling Fokker D-7. Hopefully your new magazine will explain the ups and downs of flying, and also how to do a better, neater, cleaner and more precise job on all types of flying craft in a shorter period of time.

Doug Gardner, Age 14, Covina, Calif.

Up, up and away...

After seeing Bill Watson's Rogallo wing machine in "Tail-less Tale" (July 1971 AAM), I decided I had to have a flex-wing aircraft too. This was my first attempt at designing a model plane, so I decided to keep the cost low, just in case I was unsuccessful. The finished plane had a 45" wing span and was Cox 020 powered.

After the model and the usual test gliding procedure completed, I was ready for powered flight. Since I didn't think it would get off the ground, I completely filled the engine's tank. After a graceful hand launching, the flex wing slowly climbed to an altitude of about 100 ft. while doing tight 50-ft. circles. It surprisingly stable and flew at a fairly slow speed.

When I discovered that the engine didn't seem to want to quit, I began to get impatient. Finally I stopped running and the plane suddenly shot skyward and out of sight. It seems that the engine downthrust was holding the plane down while under power. I never did recover it after its first—and last—flight.

Thomas Black, Carmichael, Calif.

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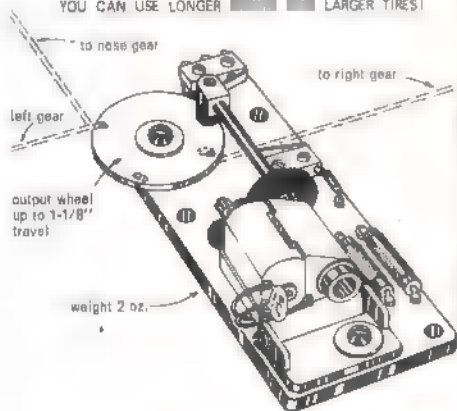
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AT THE FREE-FLIGHT WORLD CHAMPIONSHIPS

by BOB HATSCHEK

When one sandwiches six 180-sec. maxes around a "bad" flight of 179 sec., he expects to place fairly well in most free-flight meets. That's just what New Zealander Paul Lagan turned at the World Championships, and he placed 20th in the power event—just 1 sec. out of the 19-man flyoff. The point is simply that no meet in the world is like a World Championships. When the three best men in each of three events are representing their 32 nations, virtually anybody is capable of winning—or losing.

When the meet (June 30 - July 6) is held in a place like Gothenburg, Sweden (latitude 58° north, about the same as Juneau, Alaska), you can expect general conditions to be somewhat different than those found at a typical U.S. contest—and they were.

The first five rounds were held each day from 4:30 a.m. until 10:00 a.m. (about the time the sea breeze came up) and the last two rounds were held from 6:00 p.m. (when the breeze eased) until 8:00 p.m.—then the fly-offs. Overall, the weather was beautiful, and the U.S. team members seemed to acclimatize quickly to the 3:00 a.m. dawn and daylight until 11:00 p.m. Sleeping was done in two shifts: three or four hours at night and a similar afternoon siesta.

But the odd hours and the low-angling sun generated thermal conditions that were quite alien to the Americans. In general, lift and downdrafts were both gentle and difficult to detect—in spite of the great number and variety of thermal-sensing equipment used by several countries. These included bubble-generators and long Mylar tapes elevated on poles (one watches to see if the bubbles or Mylar drift up or down), and sensitive temperature-change detectors using thermistors and electronic circuitry to indicate either temperature change or rate of temperature change.

Another item of equipment almost universally used was Citizen's Band handy-talkies for communication with downwind retrieving crews. The Babel of languages coming in included all accents of English, French, German, Russian, Czech, various Scandinavian tongues, and others.

Technical trends and innovations worth noting included high-revving engines (up to 26,000 rpm) without pipes, in power models. The U.S. team's high-climbing models used Bartels fiberglass props based on the Cox 7-3½. Extensive use of autostabs and auto-rudders—and an auto wing tab (about six sq. in.) on Verbitsky's left wing just inboard of

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the polyhedral break. A flapped-wing model, changing airfoil for the glide, was flown to second place by Thomas Koster.

Auto-rudders and autostabs were almost as widely used on Wakefields as on power models. Most of these were actuated by timers, but others were actuated by tension or torsion of the rubber motor. Most unusual gadget on a Wakefield was the delayed-action prop start on one of the models by Reiner Hofuss. He javelins the model into the air with its prop blades folded and one to two seconds later a timer releases the prop. This gives him about 15 feet of extra altitude and makes sure that the timer (which also operates autostab and rudder) is running. If the prop doesn't release, the model comes in at under 20 seconds, and another chance is given under the rules.

Tow techniques and tow hook gadgetry took the limelight in the Nordic developments. Anti-falloff mechanisms (which release the line after a heavy pull) and circle towing techniques allowed some fliers to keep their gliders on the line for as long as 20 minutes while looking for the extremely elusive lift.

When the results were tallied, Pavel Dvorak of Czechoslovakia, headed the list in Nordic with 1260 plus 168 in the flyoff. Austria headed Team with 3619. In Wakefield, Josef Klima, also from Czechoslovakia, was first with 1260 plus the flyoff 232. Team went to Denmark with 3762. Sweden took top honors for Power in both individual and Team. Rolf Hagel added 240, 300, and 328 to his perfect 1260. Team ran up 3780.

What of the U.S.? In Nordic the top place, 17th, went to Dennis Bronco, but we showed fairly well with a third in Team, behind Austria and Russia. It was better in Wake where Bob White came in a fairly close third in the flyoff; and there we were 7th in Team. In Power the best we had, Jim Taylor, came in 29th—but that was only 23 under the list of 1260 all-maxes. It was 13th in Team.

International camaraderie is still another aspect of a World Championship meet that makes it unique—and there were 222 entries from 32 countries, plus helpers and hangers-on, at Gothenburg. They came from every continent on earth. With only a few exceptions (such as the very aloof North Koreans, who put in an outstanding performance for a first-time effort) the world-wide competition stresses the similarities among people rather than the differences in their politics. And thermals recognize no man's flag.



Winning by 7 sec. in 3rd flyoff round was Rolf Hagel, here launching power job. All three Swedes maxed out for perfect score.

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Jim Clem is shown at right with the winning Witch Doctor 570, one of his own designs, which Sig plans **to** hit under the name ABC Scrambler.

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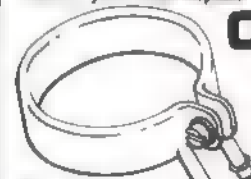
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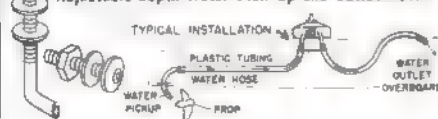
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Smiling Josef Klima topped Wakefield for Czechoslovakia with 232-sec. flight in a 12-man flyoff at 8:30 in the evening.



Purposeful Pavel Dvorak, Czechoslovakia, brings his Nordic to flyoff site. Shortly thereafter had beaten all contenders.



Free Flight simple? Koster's (Denmark) had programming panel for flapped wing, auto-stab, autorudder. Note hinged hatch.



Latest in Russian Wakefield technology. Aluminum meter tubes, with rubber-tension operated autorudder and autostabilizer.



Averill, U.S.A., using Taylor's electric starter and light-sensitive Heathkit tach. Averill, Taylor both exceeded 25,000 rpm.





Recording temperature system using thermistor sensor belonged to U.S.A.'s Allen. Air conditions unlike those at meets at home.



Quaint East-European dance beneath gliding Nordic attempted to break loose a thermal-starting bubble. But did it do any good?



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Koster, Denmark, claims 7 min. on 10-sec. run in still air. He used auto flaps as well as autorudder and autostabilizer.

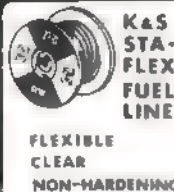
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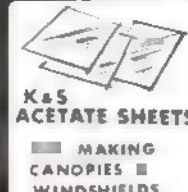
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